Basic Lessons in ORA and AutoMap 2012

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14. ABSTRACT

ORA is a network analysis tool that detects risks or vulnerabilities of an organization?s design structure. The design structure of an organization is the relationship among its personnel, knowledge, resources, and tasks entities. These entities and relationships are represented by the Meta-Matrix. Measures that take as input a Meta-Matrix are used to analyze the structural properties of an organization for potential risk. ORA contains over 100 measures which are categorized by which type of risk they detect. Measures are also organized by input requirements and by output. ORA generates formatted reports viewable on screen or in log files, and reads and writes networks in multiple data formats to be interoperable with existing network analysis packages. In addition, it has tools for graphically visualizing Meta-Matrix data and for optimizing a network?s design structure. ORA uses a Java interface for ease of use, and a C++ computational backend. The current version ORA1.2 software is available on the CASOS website: http://www.casos.ece.cmu.edu/projects/ORA/index.html.

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Abstract

ORA is a network analysis tool that detects risks or vulnerabilities of an organization's design structure. The design structure of an organization is the relationship among its personnel, knowledge, resources, and tasks entities. These entities and relationships are represented by the Meta-Matrix. Measures that take as input a Meta-Matrix are used to analyze the structural properties of an organization for potential risk. ORA contains over 100 measures which are categorized by which type of risk they detect. Measures are also organized by input requirements and by output. ORA generates formatted reports viewable on screen or in log files, and reads and writes networks in multiple data formats to be interoperable with existing network analysis packages. In addition, it has tools for graphically visualizing Meta-Matrix data and for optimizing a network's design structure. ORA uses a Java interface for ease of use, and a C++ computational backend. The current version ORA1.2 software is available on the CASOS website: http://www.casos.ece.cmu.edu/projects/ORA/index.html.

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ORA Lessons

Below are links to lessons on how to perform many common dynamic network analysis tasks as well as using ORA in general:

An Overview of the ORA GUI panels

Meta-Networks: From the beginning

Running a Key Entity Report

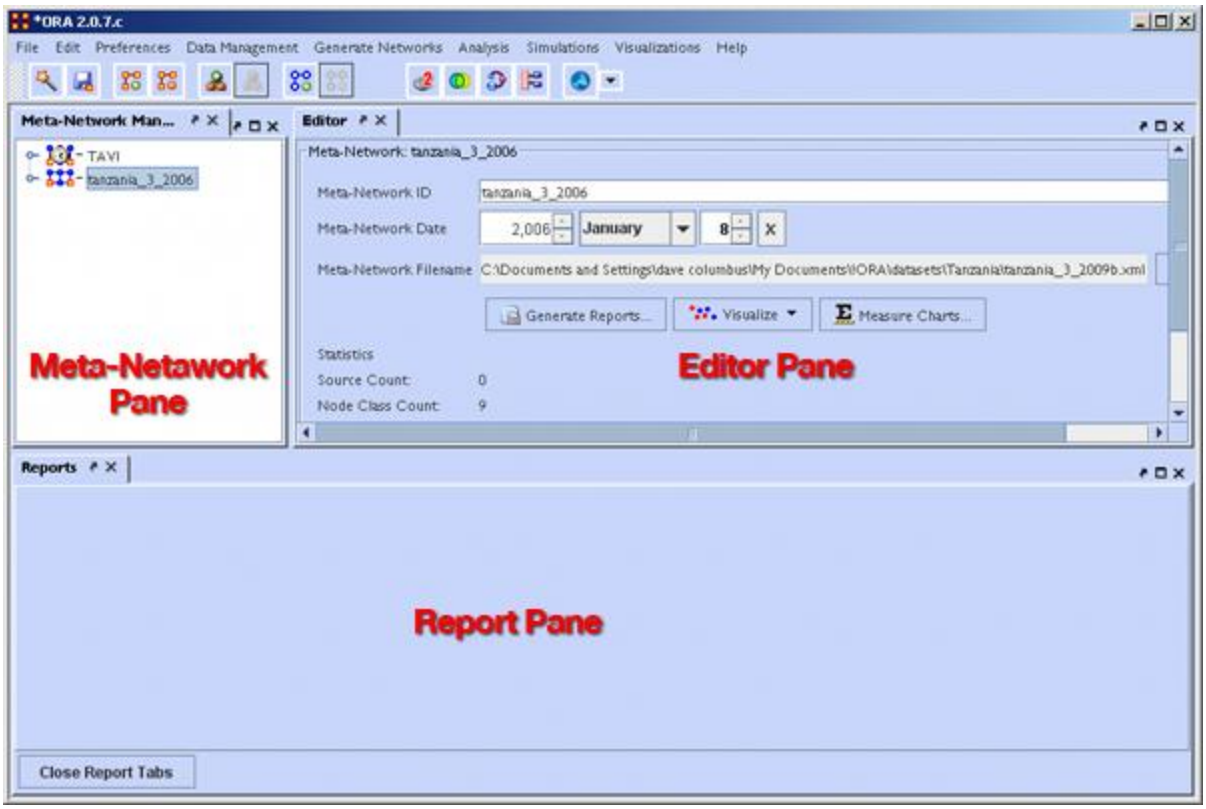
Using The Over-Time Viewer

Working with The Network Converter

Change Detection

Working With Attributes

ORA Overview



The **Main Menu** runs across the top of the window, and the rest of the screen is divided into three panels.

Below the menu is the **Toolbar**. ORA starts with buttons to add and remove Meta-Networks, NodeClasses and Networks. Using the inverted triangle you can add or delete buttons from this strip.

The Meta-Network Pane displays a list of the Meta-Networks that has been loaded into ORA, its components and sub-networks. To view information about a particular meta-network or sub-network, single-click on it.

The Editor Pane displays information about the meta-network or sub-network highlighted in Panel 1.

The Report Pane displays information about the results of analyses run on your meta-network.

Loading a meta-network into ORA

You have three options for opening your meta-network in ORA:

- From the main menu select **File ⇒ Open Meta-Network**. A small window titled **Help: Opening meta-network** pops up. Your data should already be in the correct format, so click **[OK]**.

- Next, a file chooser titled **Open** pops up. Browse to the location of your dataset, **single-click on it**, and **click the Open button** in the bottom right corner.
- **Click** the first icon in the row directly below the menu bar. It looks like a half-open file folder. A window titled **Import Data into ORA** will pop up. **Click** the Select Files button. A file chooser titled **Open** pops up. Browse to the location of your dataset, single-click on it, and click the Open button in the bottom right corner. You will be returned to the **Import Data into ORA** window. Click the Finish button in the bottom right corner.
- **In panel 2**, click the **Load button** on the far right. A window titled **Import Data into ORA** pops up. Click the Select Files button. A file chooser titled **Open** pops up. Browse to the location of your dataset, single-click on it, and click the Open button in the bottom right corner. You will be returned to the **Import Data into ORA** window. Click the Finish button in the bottom right corner.

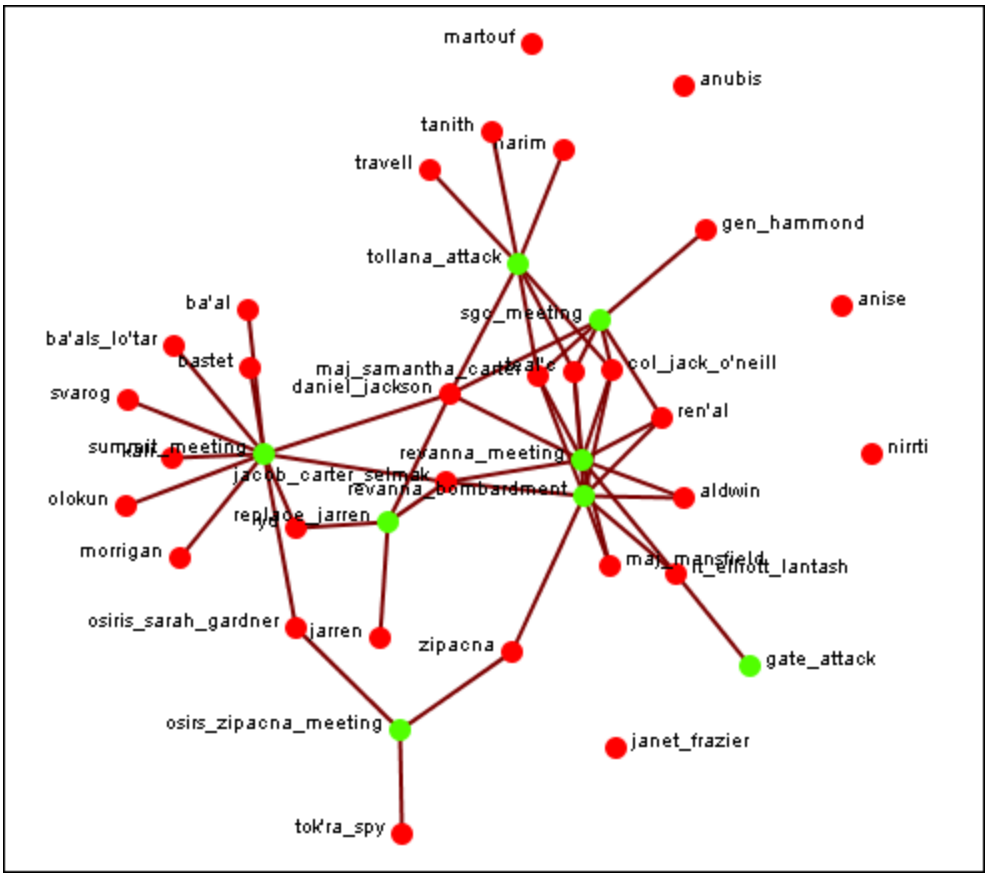
A list of your meta-network and sub-categories in Panel 1, as well as the location and basic statistics of your meta-network in Panel 2 will appear. ORA is ready to begin analyzing the meta-network.

The Visualizer

To visualize a meta-network, first make sure the meta-network you wish to visualize is highlighted in Panel 1. If it is not highlighted, single-click on it.

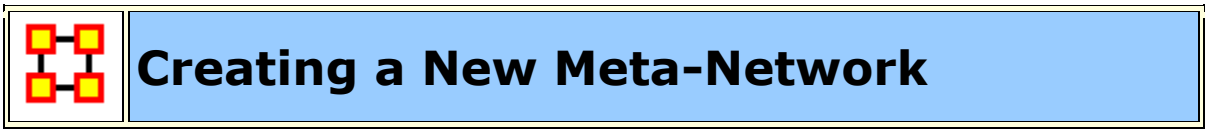
In Panel 2, click the Visualize this Meta-Network button. A new window will pop up displaying your meta-network graphically. A small legend also appears.

Below is a screen capture showing the visualization of the **agent x event** graph from the Stargate Summit Meta-Network.



The visualization displays the connections between all items in the **Stargate Summit Meta-Network**. The red circles represent the agents, the green circles represent individual events in the scenario, and the lines represent the connections between the agents and the events.

You'll notice there are agents with no connections to any events. They represent nodes that were connected to the scenario but not to the particular events of the Summit timeline.



Creating a New Meta-Network

These lessons will give you the information in order to create a **Meta-Network** from data you have on-hand.

Lesson - 101

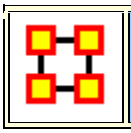
This section describes the process of looking over your data and deciding what is relevant for inclusion into a Meta-Network. It takes the examples I used for the Stargate dataset.

lessons - 201-207

A step by step run through of creating the Meta-Network from working with Excel, exporting data to csv files and finally building a complete Meta-Network.

lessons - 301+

Lessons dealing with importing data from other programs.



Examine Your Data

General Thoughts

When you first open up ORA you need to construct a Meta-Network. But the question is, how do you go about this task?

First, you need to understand what constitutes a Meta-Network. The basic building blocks of all Meta-Networks is a **Node***. Similar nodes are combined to build **Node Sets***. Node Sets are combined to make **Networks***. Multiple networks are combined to create a **Meta-Network.***.

It is up to you on **HOW** to construct the individual Node Sets and Networks and how to combine the Networks into a Meta-Network. This means you need to gather as much information regarding the scenario as possible **(who, what, when, where, and how)**

Knowing as much about the scenario as possible is important. Information about the people involved, where these people were seen, what items they had available and used, what they knew, what tasks they performed, what resources are needed to perform those tasks, etc. The more relevant information you collect the better your final Meta-Network. will be.

NOTE : *For this lesson I will be using the Foundation Trilogy-1 dataset.*

I found that for the help file using a set of data where you **know all the answers** helps. But that won't always be the case. If you already know what the results are supposed to be then it's easy to build a correct Meta-Network.

But the most important part of this is it helps you to learn what to look for. You'll initially make mistakes but if you instantly jump into creation mode then, well, since you're not sure how to build this in the first place then how can you be sure your Meta-Networks are built correctly in the first place?

What's in a Node Class

There are **eight NodeClasses** used in Foundation: **Agent, Event, Knowledge, Location, Organization, Profession, Resource, and Task**. ORA contains the ability to create new Node Classes but in most cases that's entirely unnecessary because most of ORA measures are designed to work with most common eight classes mentioned above.

*With **Foundation** the agents were easy - find the important characters in the story. The locations were also easy using scenes form the story. It was the events, knowledge, resources, and tasks which became slightly harder to discern. I'll admit there were multiple **false starts*** (missing some events, unnecessary locations, misplaced knowledge/resources) *before I came to a proper conclusions.*

Node sets can be either **binary (0 or 1)** or **numbered (negative #, 0 or positive #)**. A Meta-Network. can contain a combination of the two types.

When building Node Classes and Networks (and then onward to Meta-Networks) you'll discover that many networks are are very apparent while others were almost invisible. You'll have some large networks while others may be extremely small. But all networks are necessary to produce the complete Meta-Network.

And the depth of the Node Classes can be extended by affixing **attributes*** to them.

***Foundation** uses attributes to give extra information such as an agent's **gender or job title**. Any addition information can be placed into an attribute.*

Agents (Who)

It's usually best to start out by constructing the **Agent NodeClass**. This helps reveal many facets of the rest of the Meta-Network. Gather all possible information about the **Agents** involved. If a new piece of information appears for an Agent then fill in the blanks for the rest of the Agents.

*The **Foundation Agent NodeClass** contains a mere 10 agents. The information I deemed important for attributes were **gender, home world, and Job Title**.*

After you've collected all the agents involved you can proceed to creating your first network. Figure out which agents had any contact with each other and place a **1** in the corresponding cell. Depending on the particular circumstances you will have to establish criteria for an association. An **Agent x Agent** network creates a **Square Network** meaning the names in the rows are identical to the columns.

*The **Foundation Meta-Network** was fairly easy to construct the agent NodeClass and Agent by Agent Network. But Remember, real life data doesn't always come with such an **easy to see** diagram. After a Meta-Network is constructed it very likely that new information will surface which will change the face of the current Meta-Network. and, thusly, the results of any reports.*

There are three modes of thought in creating connections. **1)** The most common would be to say if one agent knows another agent then place a 1 in the cell. **2)** Next would be to use the preceding criteria but to weight the ties where one person could have a **higher regard** for a person more than there are reciprocal feelings. **3)** The third would be to use a hierarchical style showing who reports to who in a organizational tree situation. It's important that the person creating the Meta-Network makes a call whether there is and and how strong a tie will be. Multiple variations were gone through in the creation of the **Foundation Meta-Network**.

As you learn more about Meta-Networks it becomes easier to see which mode you need to use.

You might not create a Meta-Network. correctly the first time **(or the second or the third time)** if you rush into it. Best to take a little time and review the information before heading straight into the creation process. Sometimes **too much information** will find it's way into your Meta-Network.

A little time spent on reviewing the data and any reports will greatly improve your chances of getting it **somewhat** right in the first place. It will also help in your deciding the best way to build your Networks.

***NOTE :** Remember, you'll always find **something** that you think needs tweaked as more and more information is uncovered.*

Events (When)

Creating an **Events Node sets** is a little more difficult than for either agents or locations. Agents and locations are **tangible items** whereas events are **intangible**. They also depend on the interpretation of the individual creating the NodeClass. Events can include items like Foundation's **Hari Seldon meeting Gaal Dornick and The trial of Hari Seldon**.

*Many of the events in **first part of Foundation** were easy* (the meetings, the trial, the funeral)*. You may find events in your dataset a little more difficult to discern.*

When plotting events it may be necessary to show **what order** they occurred. What happened first, second, third, and so on. This helps discern which agents are needed in which parts of the scenario. One method would be to give it an attribute with a numbering system.

Another would be to link one event to the next event in line. To create an ordered **event x event** network start with the row of earliest event. Place a check mark in the column for the next event. Find the row for the column you just check marked. Follow that to the column with the next event. Proceed in this manner till you have all your events. You may, as happened in the Stargate Network, that two events sprout from a single event. They may, or may not. converge back to an ending.

Knowledge (What)

Many times more than one person knows the same thing. And other times there is a single person who has some vital knowledge. This is a way to help find out if one person is completely indispensable or whether there are other pathways to accomplishing the goal.

*In **Foundation** the knowledge **mathematics** is known by **Hari Seldon, Gaal Dornick, and Wanda Seldon**. But only **Hari Seldon and Wanda Seldon** have the knowledge **psychohistory**. But only Bor Alurin knows **Psychology**.*

Locations (Where)

Next create a **NodeClass** of all the **locations** involved in the scenario. Locations are places like Foundation's **Streeling University and the Imperial Palace**

*For the **Foundation Meta-Network** it was a simple matter of following the book and marking down who was in what scene. Not quite a simple when you've got less than perfect data.*

Create a list of all possible locations and use your best guess as to whether that location is important. Remember, just because people are seen in a location doesn't mean it's important to the Meta-Network. You may have a location you think is important initially but come to find that nothing happened of interest there (or visa versa).

*For the **Foundation Meta-Network.** it was difficult to focus in on the exact **locations** necessary. The first time only the major locations were used, but it was difficult defining specific tasks. Then all locations were added but it ended up have many isolates and pendants that became unnecessary. I finally settled five important locations.*

Organization

Organizations usually consist of groups of people banded together for a common goal. This can range from a large political group [**Republicans or Democrats**] to The Three Musketeers [**Athos, Porthos, and Aramis**]

*In **Foundation** these organizations were mostly specialty groups like **The First and Second Foundations and the Empire**.*

Profession

Professions can define any activity an agent partakes in **i.e. Federal Judge, Fireman, or Crack Dealer**.

*For **Foundation** I had mostly normal professions like **Attorney, Judge, and Psychologist** but also the story contained some special ones like **Psychohistorian and Aristocrat**. You list whatever jobs the agents are doing.*

Resources (What)

Resources can be very similar to **knowledge** and many times these two overlap. It's not necessary to always have both.

*You may find that it is necessary for a node to have a certain knowledge before they can use a certain resource. In **Foundation** it is necessary to have knowledge of **mathematics** before you can use the resource **prime radiant**. There is no special knowledge necessary to listen to the **Seldon Psychohistory recordings**.*

Tasks (How)

Tasks are things that are done by the agents such as Foundation's **preside over Seldon's trial or force exile of encyclopedians**.

A task network can be set up to show the order that tasks need to be done in order for the scenario to be played out. For example, *procuring materials to build something* is always necessary before *building something* but not necessarily before *planning*. This is usually done with a directed graph **(i.e. a link from procuring to building but not the other way around)**.

*As in the example of **Events** above certain tasks need to be completed before others can be started. **Foundation** uses a **binary, directed** network showing a pathway of which tasks **are required** to be completed before the next task can be started. **spy on Gaal Dornick for emperor and deliver message for Seldon lead to preside over Seldon's trial which then leads to force exile of encyclopdians**. Other networks can be much more complicated than this.*

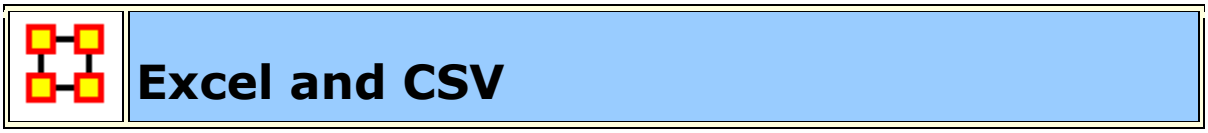
Tasks are exclusively attached to agents. You can't have a **location, event, etc. performing a task**. But this is not to say that you can't have a task attached to a location as it might necessarily need to be done at a certain location or a resource necessary to complete a task.

***Linge Chen** could only **preside over Seldon's trial** at **the Imperial Palace**. Nor could **Gaal Dornick** do the task **seal Seldon recordings in Vault** anywhere but on **Terminus**.*

Networks

After creating all your **NodeClasses** you then move on to creating **Networks**. Every Meta-Network. will require a slightly different set of **NodeClasses and Networks**. Below are the **Foundation** NodeClasses.

*The **Foundation NodeClasses** consist of: agent x agent, agent x event, agent x knowledge, agent x location, agent x organization, agent x profession, agent x task, event x event, event x location, knowledge x knowledge, knowledge x profession, knowledge x resource, knowledge x task, organization x event, organization x resource, organization x task, profession s knowledge, resource x event, resource x location, resource x organization, resource x profession, resource x resource, resource x task, task x event, task x location, task x profession, and task x task.*



Excel and CSV

You learned from **Meta-Network 101** about how to survey your data, the different forms it can take, and how to make it a fit for ORA. In this lesson we'll go through the procedure of creating a Meta-Network using the Foundation dataset in some practical examples.

Your first NodeClass

Your first NodeClass will more than likely be an **Agent Node set** since all other node sets are either referred to/or by the Agent node set Review you data and make a list of the people involved.

*After reading **The Foundation Trilogy** I decided to break it up into 9 sections. In the first section I came up with 10 important Agent nodes.*

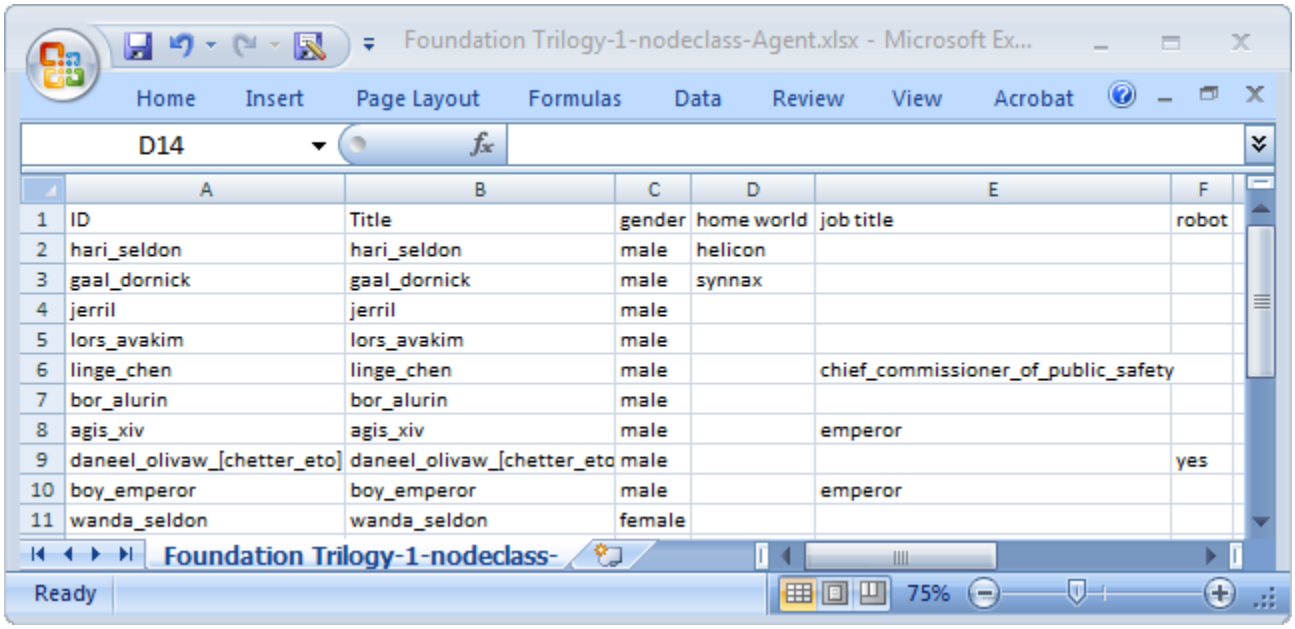
What program should be used to create the information?

You need a program that can create **.csv** files that your system can read. **Microsoft Excel is an excellent choice** as it has good copy/paste features, multiple spreadsheets in one files, and known compatibility with ORA.

The Agent NodeClass was created with names of the characters which were used for both the **Node ID and the Node Title**. Some people use anoynomous Node IDs like **A1, A2, A3…**. The order of the Agents is unimportant as long as you keep

the relationship between IDs and Agents consistent throughout your work. The IDs are what allows ORA to match information in various files.

NOTE: *If using IDs like* ***A1*** *I've found prefixing 0 or 00 to the number helps when sorting.* ***i.e. A01-A99 for up to 100 Agents****.*



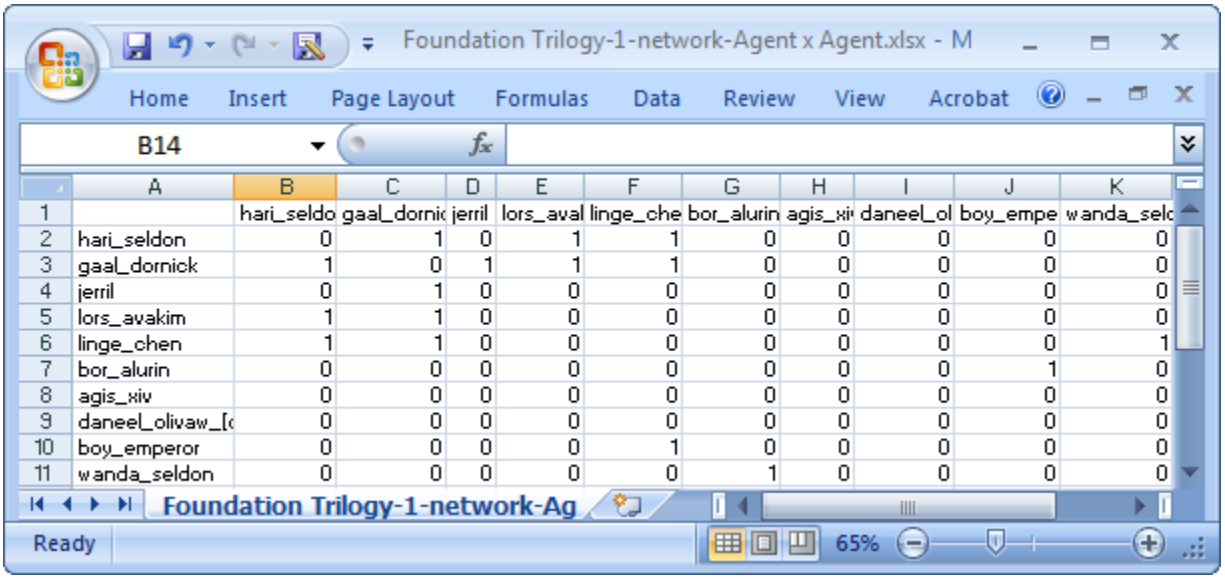
	A	B	C	D	E	F
1	ID	Title	gender	home world	job title	robot
2	hari_seldon	hari_seldon	male	helicon		
3	gaal_dornick	gaal_dornick	male	synnax		
4	jerril	jerril	male			
5	lors_avakim	lors_avakim	male			
6	linge_chen	linge_chen	male		chief_commissioner_of_public_safety	
7	bor_alurin	bor_alurin	male			
8	agis_xiv	agis_xiv	male		emperor	
9	daneel_olivaw_[chetter_eto]	daneel_olivaw_[chetter_eto	male			yes
10	boy_emperor	boy_emperor	male		emperor	
11	wanda_seldon	wanda_seldon	female			

Your first Network

Now that the Agent NodeClass is done the next item is to create an **Agent x Agent** Network. As described in **Meta-Network 101** just how your Agents interact with one another is subjective to the type of Network you have.

Create a new spreadsheet in Excel and copy the Agent IDs in column A starting with row 2. Then paste the same IDs in row one, starting at column 2, using the Transpose function. In Excel 2010 **Copy the information; Click the Home tab; click the downward triangle under the Paste icon; select Transpose.**. The same set of Agent IDs will be placed in row 1. Now you can begin constructing your links by placing your values for the **Agent by Agent** connexions in this matrix.

*The **Foundation** made a connection whenever any two Agents met face-to-face. This is often the way networks are constructed but there are other ways to make connections **i.e. hierarchical command structure or weighted importance of the connection**.*



	A	B	C	D	E	F	G	H	I	J	K
1		hari_seldo	gaal_dornic	jerril	lors_aval	linge_che	bor_alurin	agis_xi	daneel_ol	boy_empe	wanda_selc
2	hari_seldon	0	1	0	1	1	0	0	0	0	0
3	gaal_dornick	1	0	1	1	1	0	0	0	0	0
4	jerril	0	1	0	0	0	0	0	0	0	0
5	lors_avakim	1	1	0	0	0	0	0	0	0	0
6	linge_chen	1	1	0	0	0	0	0	0	0	1
7	bor_alurin	0	0	0	0	0	0	0	0	1	0
8	agis_xiv	0	0	0	0	0	0	0	0	0	0
9	daneel_olivaw_[	0	0	0	0	0	0	0	0	0	0
10	boy_emperor	0	0	0	0	1	0	0	0	0	0
11	wanda_seldon	0	0	0	0	0	1	0	0	0	0

The rest of the Node sets and Networks

Next you have to decide what other Node sets you need...

*I created Foundation NodeClasses for **Events :** important Events during the course of the story, **Knowledge :** important information known by individual Agents, **Location :** where particular Events took place, **Organization :** larger bodies which the individual Agents belonged to, **Profession :** jobs the individual Agents were placed in, **Resource :** material objects important to the story, and **Task:** specific jobs Agents accomplished, or tried to accomplish.*

Then I had to decide how these NodeClasses interacted with each other. Also, how important any particular Network was to the overall story.

For Foundation I decided I created a wide range of Networks. Many of these were created for specific display purposes and may not be entirely necessary in your particular ciscumstance.

Agent x Agent, Agent x Event, Agent x Knowledge, Agent x Location, Agent x Organization, Agent x Profession, Agent x Resource, Agent x Task, Event x Event, Event x Location, Knowledge x Knowledge, Knowledge x Profession, Knowledge x Resource, Knowledge x Task, Organization x Event, Organization x Resource, Organization x Task, Profession x Knowledge, Resource x Event, Resource x Location, Resource x Organization, Resource x Profession, Resource x Task, Task x Event, Task x Location, Task x Profession and Task x Task*.*

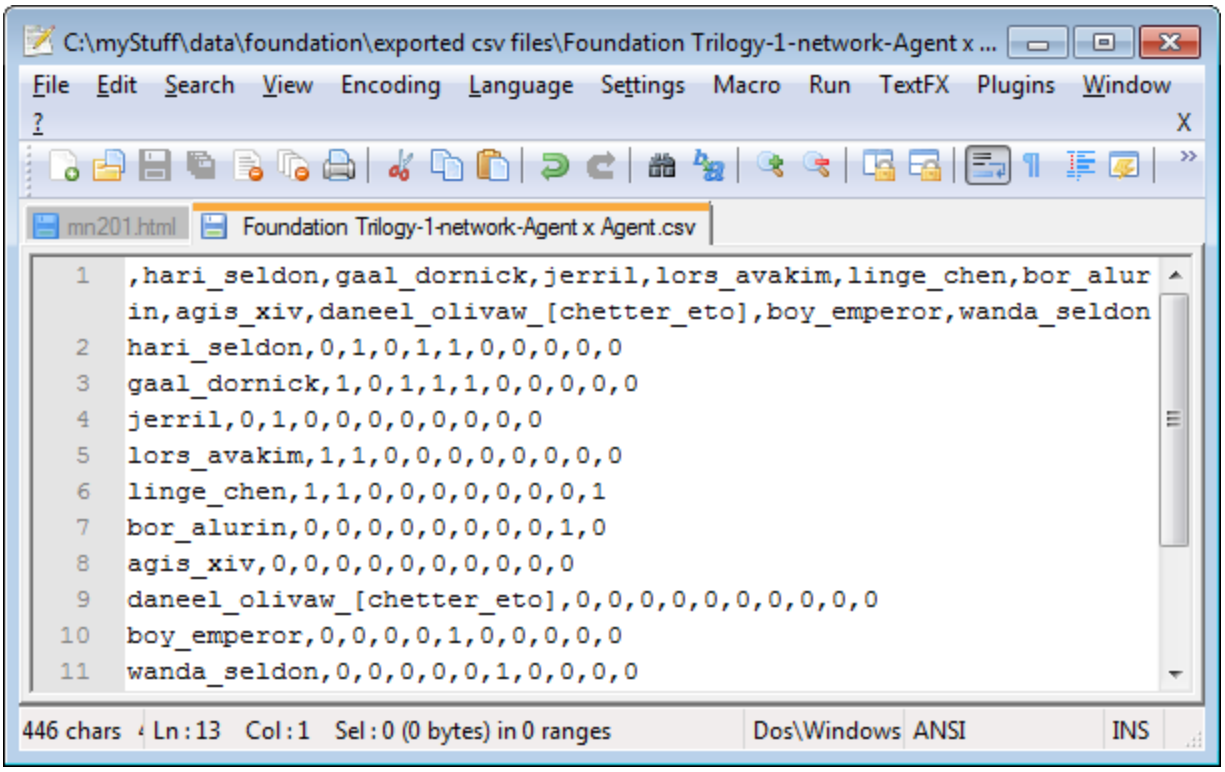
Each Meta-Network will require different handling and may require more or less networks.

Then, as done in the Agent x Agent network, decide how the various nodes interact with each other for each Network. When finished you will have spreadsheets from which you can create all your **.csv** files.

NOTE: *You can keep these as separate spreadsheets or combine them in a single spreadsheet. This is a personnal preference.*

Saving as .CSV files

The next step is to convert these Excel file to a format that ORA can import, namely the .csv format. This is easily done with Excel's **Save As** function. Select the Excel spreadsheet you want to convert to CSV. From the Excel main menu select **Save As**; scroll down to **Other Formats**; Navigate to the directory to save your file; from the **Save as type** select **CSV (Comma-delimited) (*.csv)** and click **Save**.



You can now convert all your Excel spreadsheets to CSV files in preparation for importing into ORA.

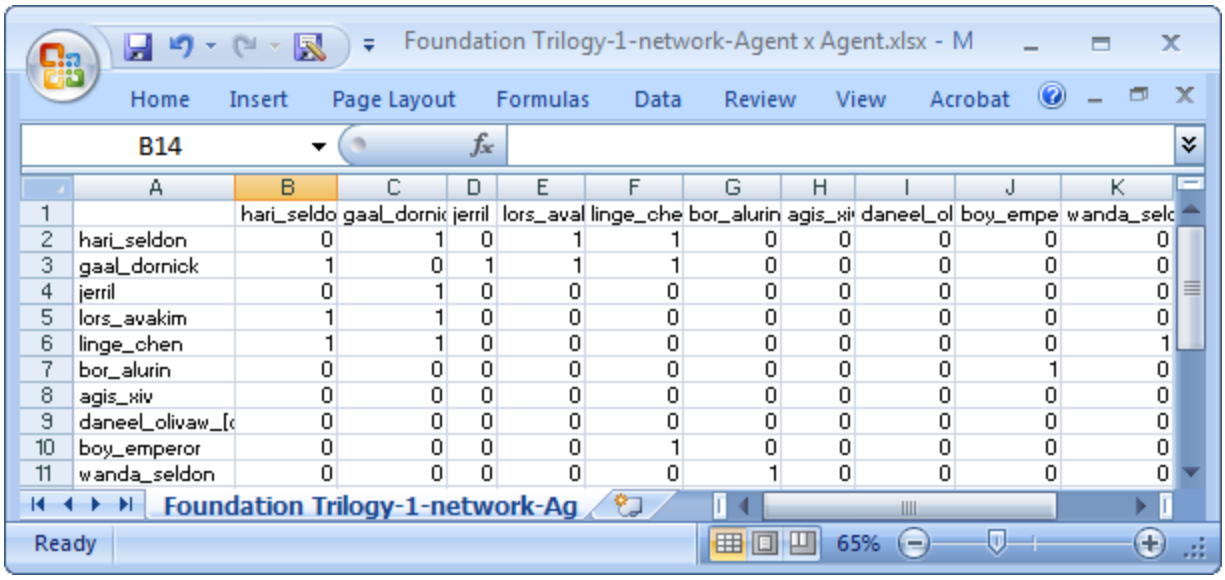
Import into ORA

NOTE : *If you are visiting this page from the help section on the* ***Data Import Wizard****, what follows is a series of lessons using the Data Import tool with the Foundation sample data set. You can start from the very beginning of this lesson by going to the preceding* ***Meta-Networks 101*** *lesson)*

Now that we've got the Excel spreadsheets created and converted to **.csv** files it's time to learn about **importing a CSV file into ORA**.

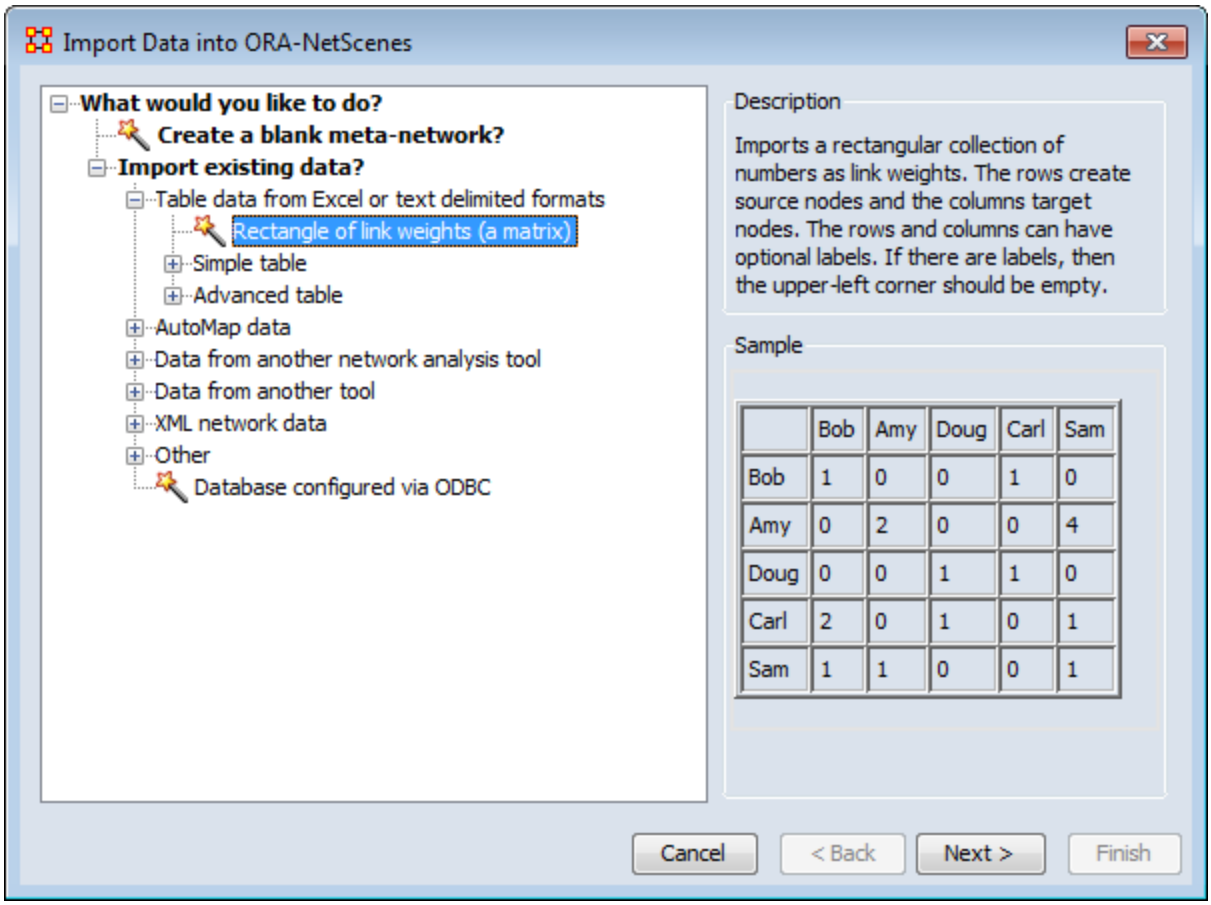
The Datasets

Below is the file we will be importing. It denotes **who has met who** in the first Foundation section.

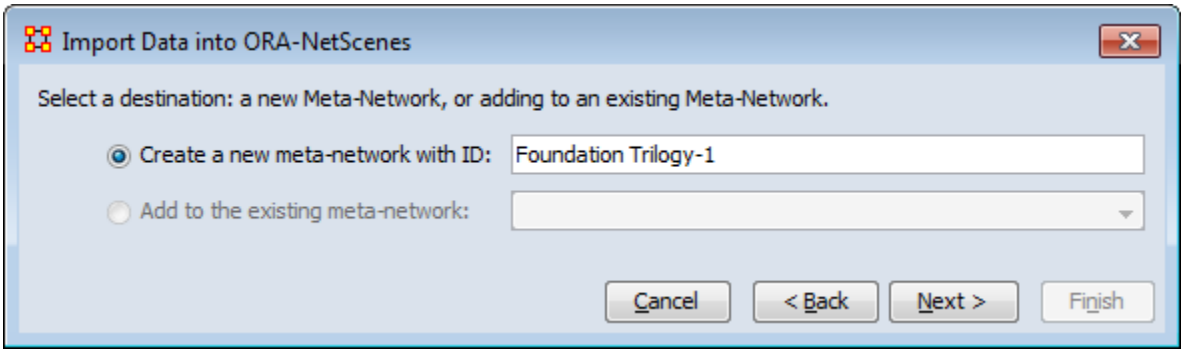


Starting a new Meta-Network

From the main menu of ORA, select **File > Data Import Wizard** or hit **Ctrl-W**. The Data Import dialog asks **What would you like to do?**. For this example we will be importing a network comprised of links so select **Rectangle of link weights (a matrix)**. Then click **[Next >]**.

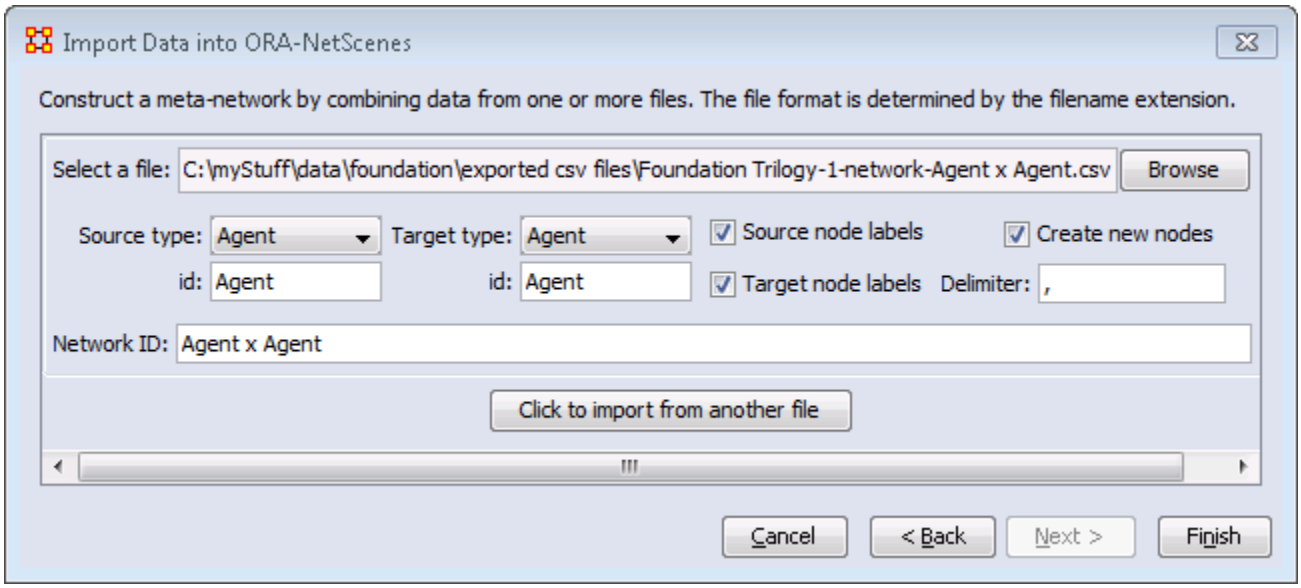


In the next dialog box you will want to select **Create a meta-network with ID:**. This allows you to import a **.csv** file in the form of a **matrix** with labels on the X and Y axis (i.e. an **Agent by Agent** graph or **Resource by Event** and link data in the body). Give your new meta-network a name. I named mine **Foundation Trilogy-1** specifying it is the first of nine parts. When you are done, click **[Next >]**.



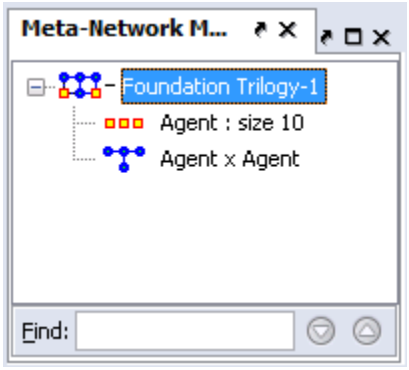
Click the **[Browse]** button and navigate to the directory where the data is located. For this example select the **sg1_agent_x_agent.csv** file. In the Source type and Target type drop down menus select the types of nodes you are using. In this case

both will be **agent**. In the **Network ID:** field, name the network **(typically for this it would be agent x agent)**. When done click **[Finish]**.



Looking in the Meta-Network panel you'll see the Foundation Meta-Network. Clicking the [+] will expand it to reveal the NodeClass and Network created. The NodeClass or Network can be examine by highlighting either to show its information in the Editor and Info tabs.

Adding to the new Meta-Network



You could, if you had multiple networks, import them all in at the same time. For each new Network file to import, click the **[Click to import from another file]** button and repeat the above procedure.

NOTE: *If at any time you want to remove a Network from the list select the* **[X]** *next to the Browse button*

Attributes

NOTE : *If you are visiting this page from the* ***Data Import Wizard****, what follows is a lesson on adding* ***attributes*** *to the* ***Foundation sample data set*** *provided with ORA. To begin the lesson from the very beginning go to* ***Meta-Networks 101****.*

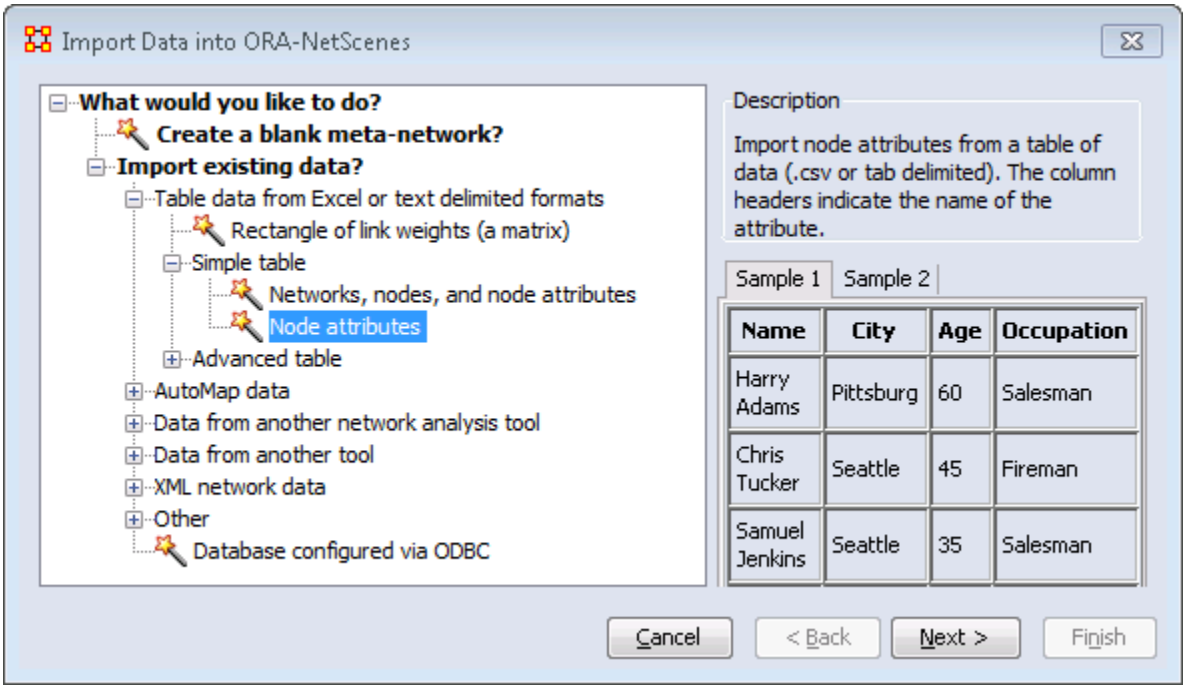
The **Foundation NodeSet** has been created when the network was imported. But even though the nodes have names, there are no attributes. The next step will be to import those from a NodeClass file.

The Datasets

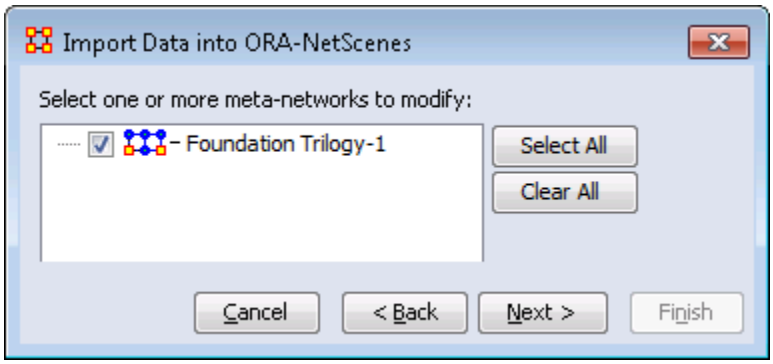
Foundation Trilogy-1-nodeclass-Agent.csv contains the attributes for gender, home world, and job title. As you can see the ID and Title names are the same as in the **Foundation Trilogy-1-network-Agent x Agent.csv** file.

Adding Attributes

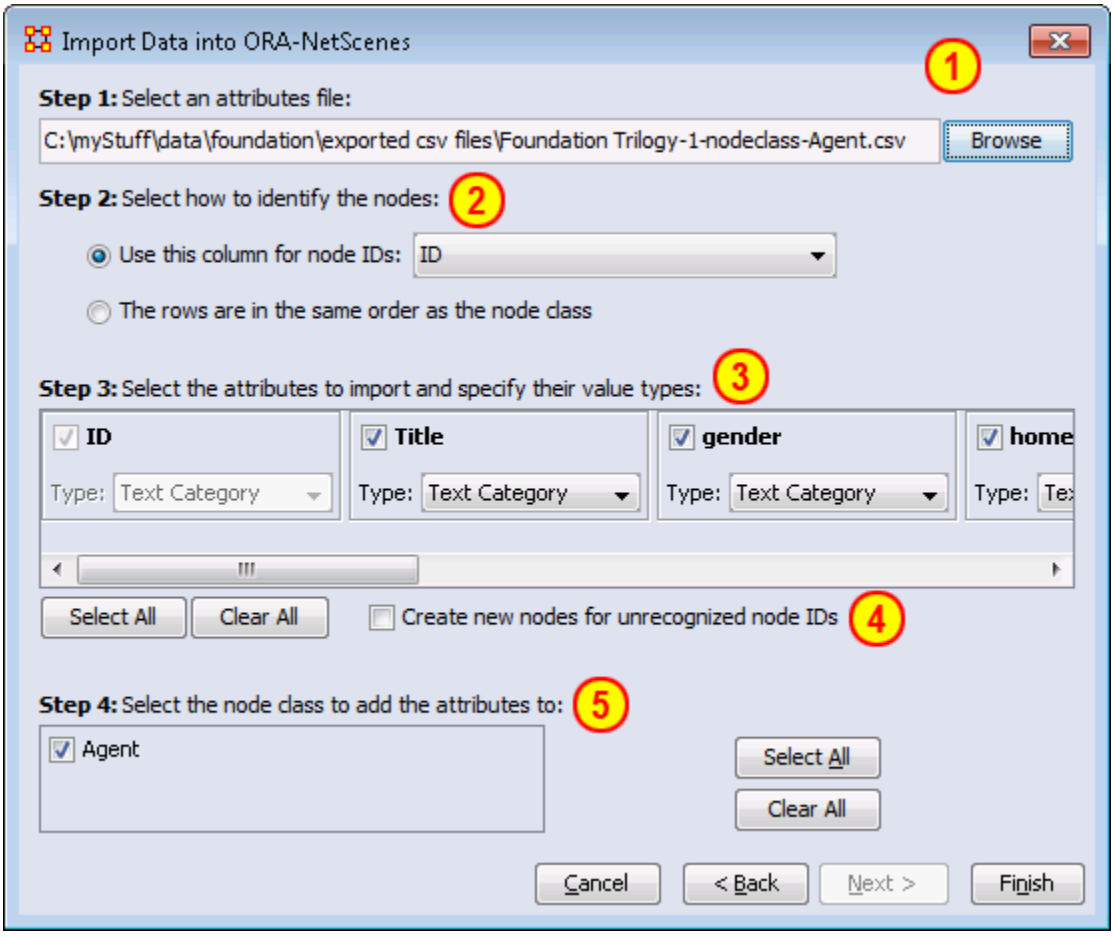
Find the **Foundation Trilogy-1-nodeclass-Agent.csv**. This contains all the attributes for all the nodes. Highlight the **Foundation** Meta-Network. Then click **Import existing data? > Table data from Excel or text delimited formats > Simple Table > Node Attributes**. The click **[Next >]**



With the basic Foundation NodeClass and Network already loaded we will now add attributes to the NodeClass. Place a check mark next to the sg1 dataset. Then click the **[Next]** button.



Below is the main dialog box to inform ORA **what and how to import the new attributes**. After the image is a description of each of the numbered steps.



- **1** With the **[Browse]** button you load the file containing the attributes to add.

- **2** Selects how to identify the nodes. If your file contains a column with node IDs use the top selection. Then select the column from the drop down menu. If your attribute file contains information in the same order as the nodes are already in then you can use the second option.

NOTE : *If you select the second option, and your nodes are in a differnt order than your attributes, the ORA will place the attributes in sequential order regardless of whether the IDs match or not.*

- **3** For each column a box will appear allowing you to chose which attributes to import. Place a check mark next to each attribute you want and give it a Type: **Text Category, Text, URI, Number Category, Number, or Date**. An attribute without a check mark will not be imported.

- **4** In this example leave this unchecked as we only want attributes for the first five nodes. This is used if the file contains additional nodes to import which were not in the original NodeClass.

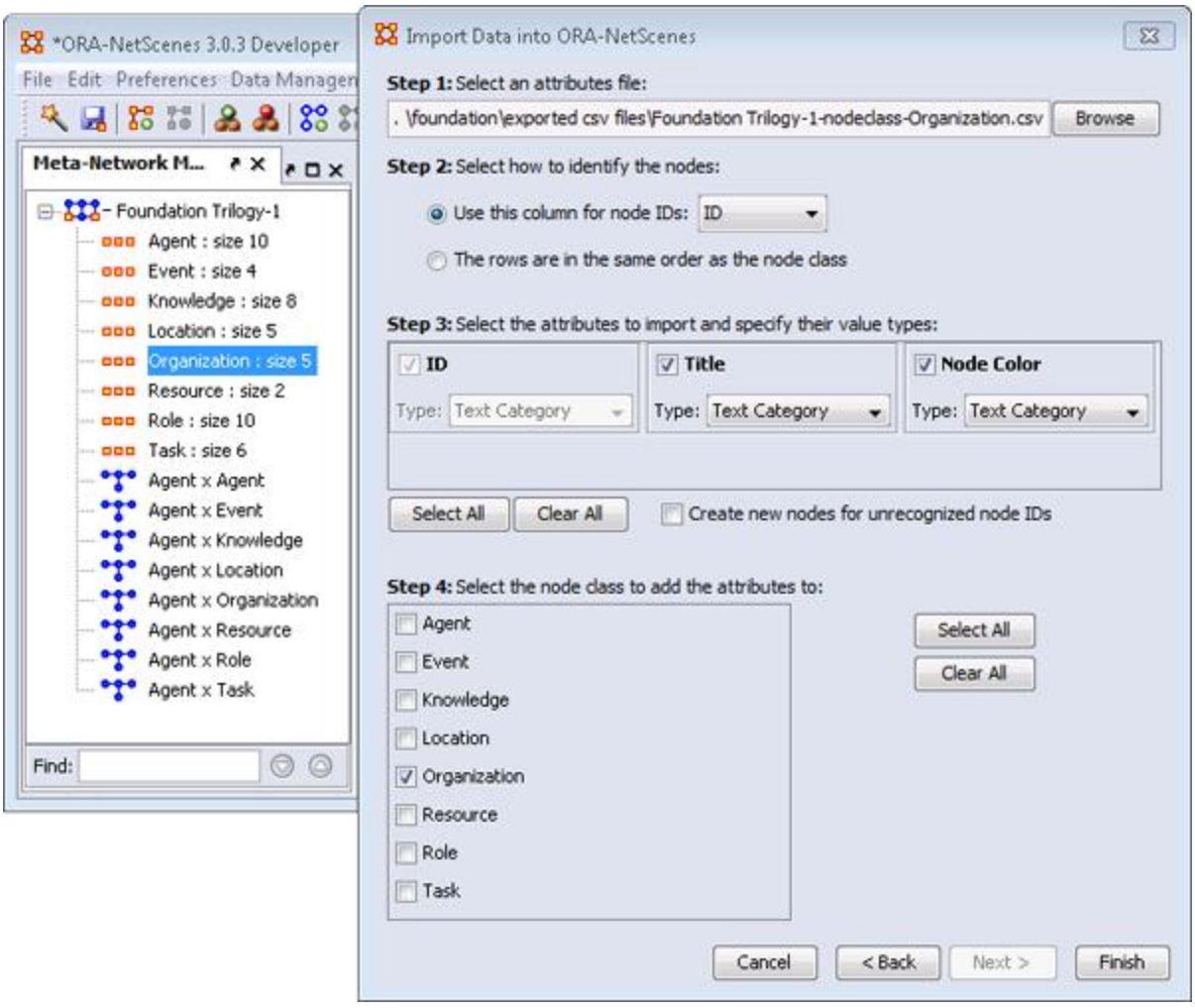
- **5** Select the NodeClass to add the attributes. Place a check mark next to all NodeClasses to add attributes to. In this example we have only one.

When finished entering information on this screen, click the **[Finish]** button. The NodeSet now contains names that match up to the IDs from the imported file.

	Node ID	Node Title	gender	home w...	job_title	Node C...	robot
☐	hari_seldon	hari_seldon	male	helicon		-8650752	
☐	gaal_dornick	gaal_dornick	male	synnax		-8650752	
☐	jerril	jerril	male			-8650752	
☐	lors_avakim	lors_avakim	male			-8650752	
☐	linge_chen	linge_chen	male		chief_com...	-8650752	
☐	bor_alurin	bor_alurin	male			-8650752	
☐	agis_xiv	agis_xiv	male		emperor	-8650752	
☐	daneel_olivaw	daneel_olivaw_[chetter_eto]	male			-8650752	yes
☐	boy_emperor	boy_emperor	male		emperor	-8650752	
☐	wanda_seldon	wanda_seldon	female			-8650752	

The remaining NodeClasses and Networks

With any remaining NodeClasses and Networks for your dataset you can repeat the previous two lessons: first importing a Network of links then importing the attributes for that nodeClass that isn't already in the Meta-Network. Below is an example when importing attributes into a single NodeClass with multiple NodeClasses in the Meta-Network



Working with SubSets

There will be times when you have a SubSet of a larger Meta-Network and you'll want to import data from a larger, main dataset. And you want to do this **without** creating new nodes. What follows are the procedures for accomplishing those goals.

We start off with the SubSet of **Foundation**, a Meta-Network of three agents. Highlight the Foundation Meta-Network. Select the **Agent Nodeclass**. Place a check mark in all nodes except **hari_seldon, gaal_dornick, and wanda_seldon**. Click the **Delete** button.

	Node ID	Node Title
☐	hari_seldon	hari_seldon
☐	gaal_dornick	gaal_dornick
☐	wanda_seldon	wanda_seldon

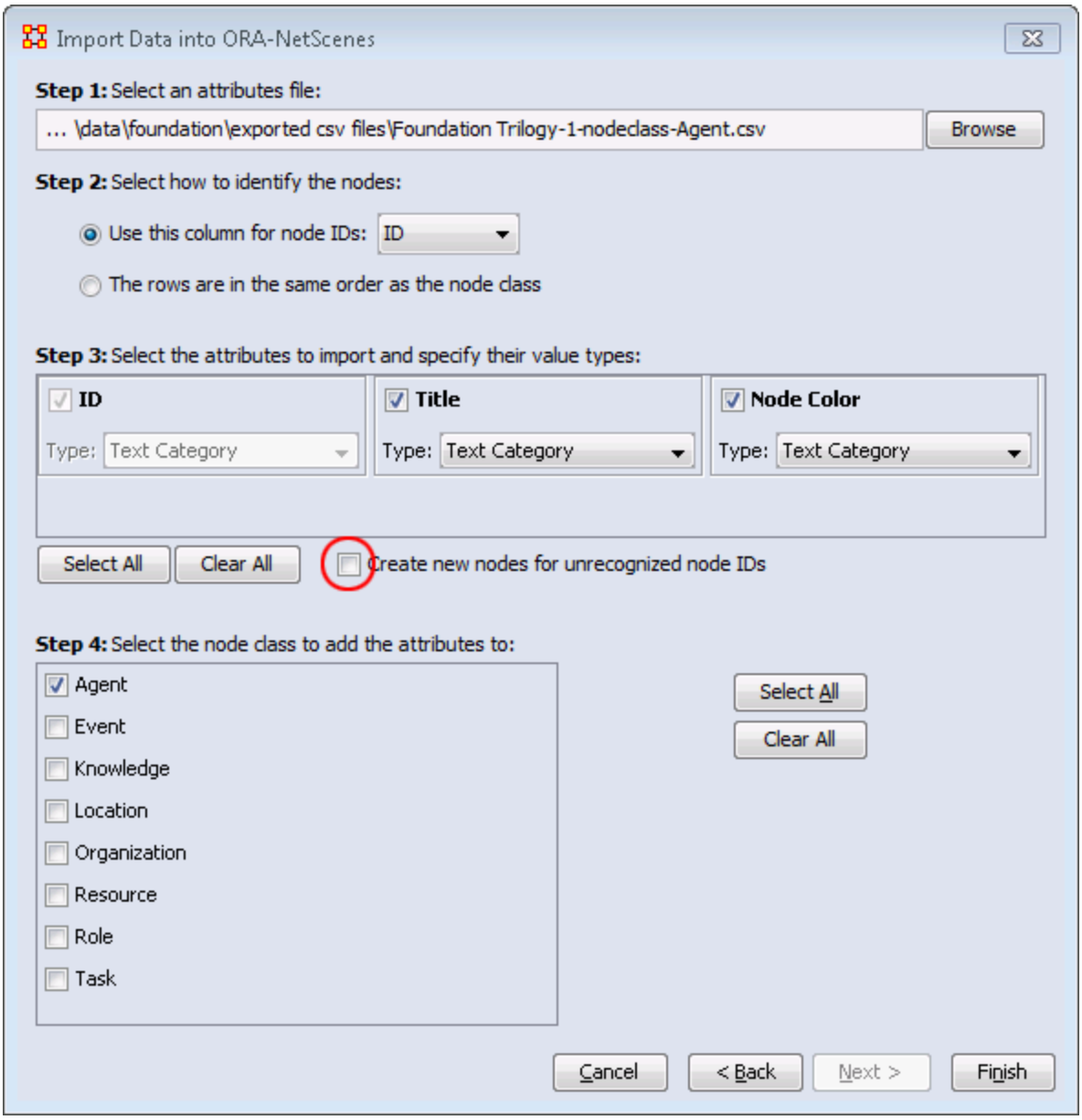
Next, under Attributes, click the [**Delete**] button on the right side of the Editor. This brings up a dialog box with the attributes in the NodeClass. A check mark indicates to ORA to delete that attribute. For our purposes we need to delete them all. CLick the [**Delete**] button.

You now have a Meta-Network with a SubSet of the original Foundation Dataset with no attributes.

For importing we will use the original file **Foundation Trilogy-1-nodeclass-Agent.csv** for the attributes

Now, as before, open the **Data Import Wizard**. Navigate to **Node Attributes** and click [**Next >**]. Select the newly created Meta-Network by placing a check mark next to the name then click [**Next >**]. Make sure Step 1 contains your NodeClass file. If not, click [**Browse**] and navigate to the correct directory. Next make sure Step 4 only has the **Agent** NodeClass selected. When read click [**Finish**]

The most important item for this to work is to make sure that the **Create new nodes for unrecognized nod IDs** remains **UNCHECKED**. This will prevent ORA from creating new nodes for the other data it finds in the file.

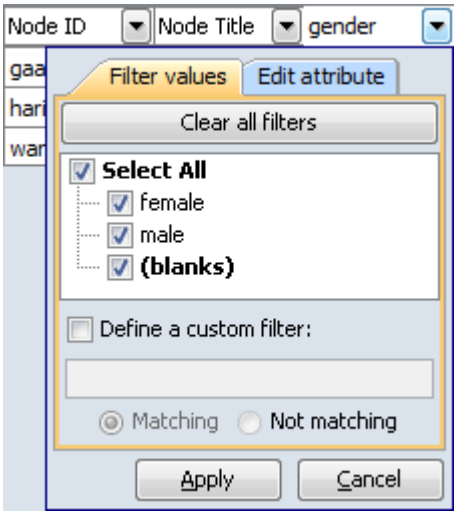
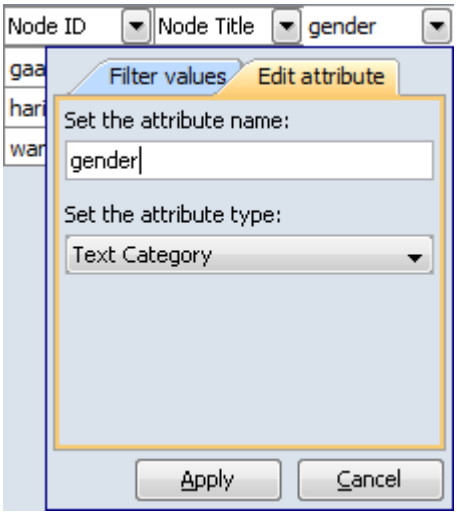


The result is maintaining a NodeSet with three nodes but attribute data from the Agent NodeClass file imported only for the attributes for the three nodes. No new nodes will be created in this process.

	Node ID	Node Title	gender	home w...	job title	robot
	hari_seldon	hari_seldon	male	helicon		
	gaal_dornick	gaal_dornick	male	synnax		
	wanda_sel...	wanda_sel...	female			

Attribute Columns

There are four functions that can done with Attributes. All four are accomplished by **Right-Clicking** on the downward arrown next to the Attribute Name. This prings up a dialog box with two tabs.

Filter Values	Edit Attribute
	

Filter Values

Clear all filters : Clears an previous filter parameters you have set.

Value check boxes : Select or Deselect values to display.

Define a custom filter : Type in specifics to use as a filter and whether or not they match the values.

Edit Attribute

Set the Attribute Name : Used for renaming an existing Attribute column.

Set the Attribute Type : Attributes can be tagged with two types: **Categorical** or **Continuous**.

Replacing an Attribute Column

NOTE: *This method is suggested as ORA has the capability of retaining multiple values. If you want to completely replace the values then* ***deletion and replacement*** *of the column is suggested.*

For most **small** changes you can type in a new attribute value or two directly into the Editor. But say your NodeSet contained quite a few nodes, and the majority of the values needed changed. If might be easier to create a new .csv file and import the values in just as in the previous lesson. In the example below it was decided to completely replace all the **skill_needed** with a new set of values.

Go to the ORA main interface and under select the NodeSet. Under the Attributes section click **Delete**. Remove all the check marks from any attributes you want to keep. All attributes with check marks will be removed.

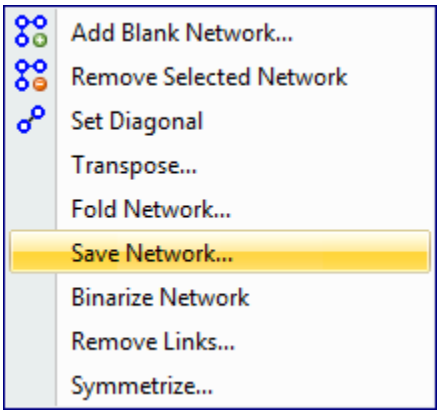
After deleting a column then use the procedure for importing Attributes from **Lesson-203** to import a new attribute information. Remember, you'll want to import into an **Existing** Meta-Network as in the example above.

The **skill_needed** attribute has been imported into the NodeSet with the revised values.

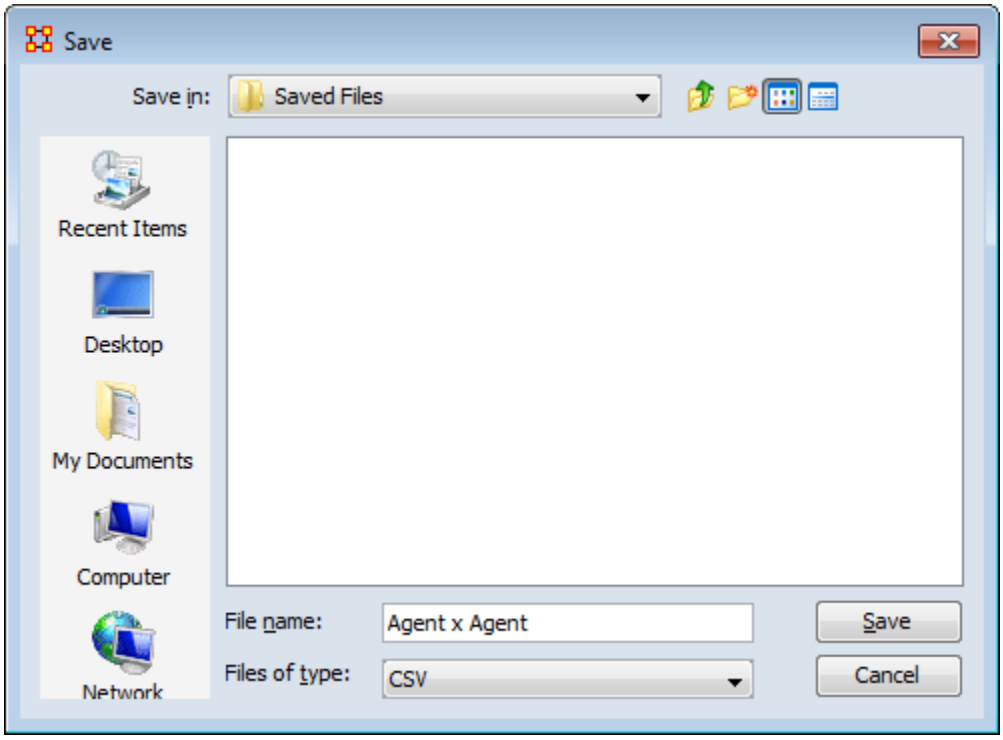
Updating Your Data Files

After importing data from the .csv files into ORA and then altering the data in ORA this somewhat makes your original data files out-of-date. What follows are the procedures to update your original .csv and Excel files with any changes that have been made recently.

Saving Your Network Data



From the main interface highlight the Network you want to save and **Right-Click**. This will bring up a contextual menu. Select **Save Network**. This will bring up a **Save** dialog box. First, navigate to the directory you want to save your new Network file. Next, select the format **(DyNetML, UCINET, DL, or CSV)** to save the file. Give it a filename and select **[Save]**.



Usually files are saved to the csv format and can be opening in a Excel or a text editor.

REMEMBER: *The UCINET uses both .##d and .##h extensions and both are needed to build a Meta-Network.*

NOTE: *Since this* ***Save*** *box does not display the files present in the directory it is* ***Highly Suggested*** *that you save to a new directory and verify which previous file you want to replace. More information on these file formats can be found* ***HERE***

Saving A Meta-Network

You can an entire Meta-Network to individual files using **File > Data Export**. This will write out one file for each NodeClass and Network. Type in a prefix name which will be ayyaced to each file, select the **Files of type**, and then click [**Save**]

Saving Your Attribute Data

The above mentioned procedure works well for saving Networks but there are also the attributes in the NodeSets to think about. All the data is can be saved from **File**

⇒ **Save Meta-Network** and the **File ⇒ Save Meta-Network...**. But this saves the data into **one xml file**. What if you what to save the data into individual files, the same as when you imported it.

The quickest way is using the **Copy / Paste** method. Values copied directly from the **Main Interface Editor** can be pasted into a **Excel spreadsheet**.

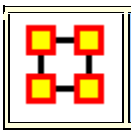
In the ORA editor, highlight the cells you need to copy. Use either **Ctrl-C** or **Edit > Copy**.

	Node ID	Node Title	gender	home w...	job_title	Node C...	robot
☐	hari_seldon	hari_seldon	male	helicon		-8650752	
☐	gaal_dornick	gaal_dornick	male	synnax		-8650752	
☐	jerril	jerril	male			-8650752	
☐	lors_avakim	lors_avakim	male			-8650752	
☐	linge_chen	linge_chen	male		chief_com...	-8650752	
☐	bor_alurin	bor_alurin	male			-8650752	
☐	agis_xiv	agis_xiv	male		emperor	-8650752	
☐	daneel_olivaw	daneel_olivaw_[chetter_eto]	male			-8650752	yes
☐	boy_emperor	boy_emperor	male		emperor	-8650752	
☐	wanda_seldon	wanda_seldon	female			-8650752	

Then switch to your **Excel** spreadsheet. Highlight the cell that corresponds to the **top/left** cell you started with in ORA and use either **Ctrl-V** or **Edit > Paste**. Entire NodeSets can be done in this fashion.

IMPORTANT NOTE: *Before you **Copy/Paste** in this manner make sure your columns are in the same order. This operation will **NOT** match up data as it's a **blind copy/paste** operation.*

You can then backup all of your NodeSets in the procedure and then re-save it to your .csv files.



Key Entity Report

The Reports

A **Key Entity Report** creates the following reports: central actors, organizations, central knowledge, resources, central events, tasks, central locations, and performance indicators.

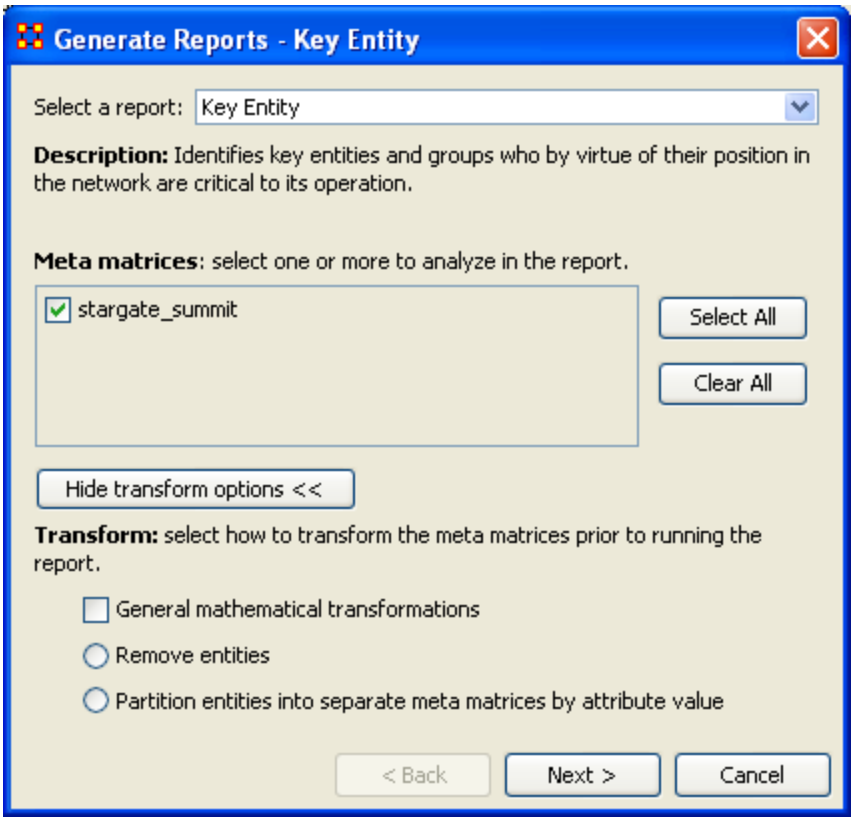
The Key Entity Report can either run its measures over the entire network or be refined or filtered to run them over only a select portion of the network.

More detailed information regarding the basic workings of the Key Entity Report screens can be found **Reports Section**.

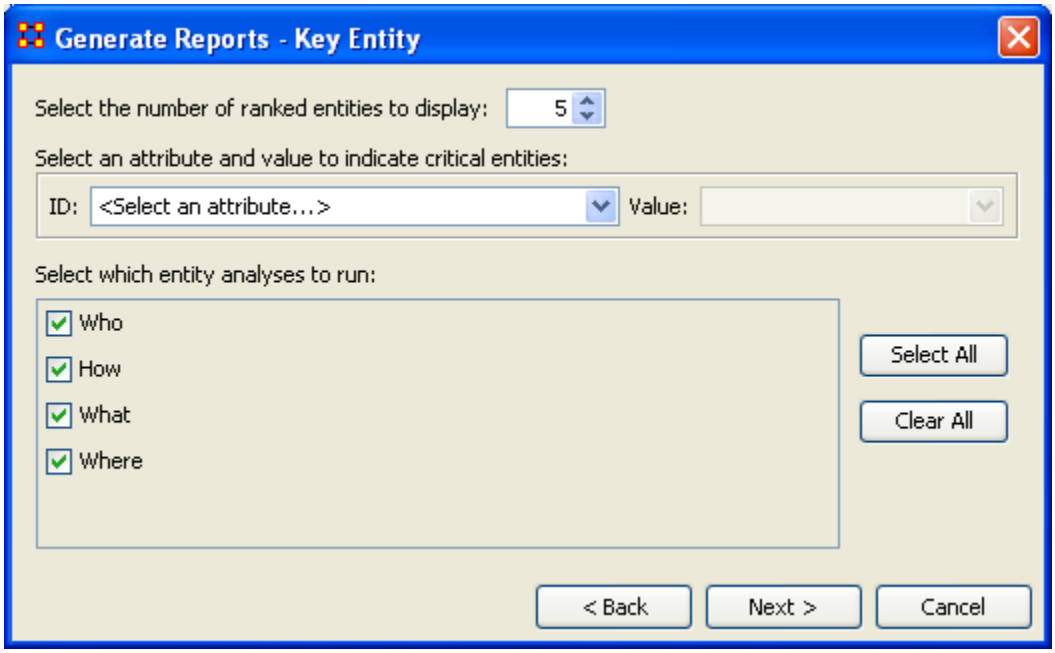
Running a Key Entity Report:

We'll be using the network **Stargate: Summit** contains all the agents involved in the scenario, friend and foe. The first report run will contain all the agents, friend and foe.

- From the main menu select **Analysis ⇒ Generate Reports** which brings up the **Generate Reports** dialog box.
- At the top of the window is a dropdown menu titled **Select a Report**. Pull down the menu by clicking the small inverted arrow icon to its right, and select **Key Entity**.
- In the box titled **Select one or more meta matrices:** select the network to run the report on.
- At the bottom of the box is the **Transform options**.
    - **General Mathematical Transformation :** Contains various formulas for manipulating a network.
    - **Remove Entities :** Remove node(s) from a network before running the measures.
    - **Partition entities into separate meta matrices by attribute value :** Create new networks based on your choice of nodes and attributes.



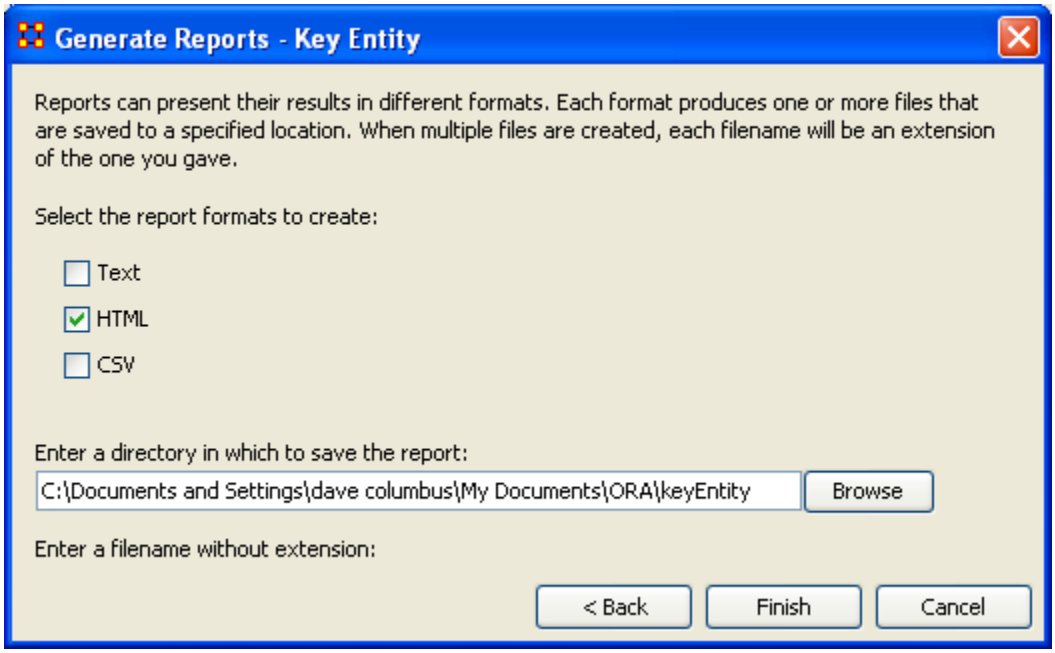
Select the **[Next >]** button at the bottom of the dialog box.



The next dialog box is for selecting **the number of ranked nodes**, **critical attribute and values** and also for selecting **which reports** you want to view. I am only interested in the top five nodes in the network and place a **5** in the top

box. I don't want to point out any particular nodes, only the friends, so I'll leave the textbox blank. I want all the reports run so I place a checkmark in all four boxes.

Click the **[Next >]** button.

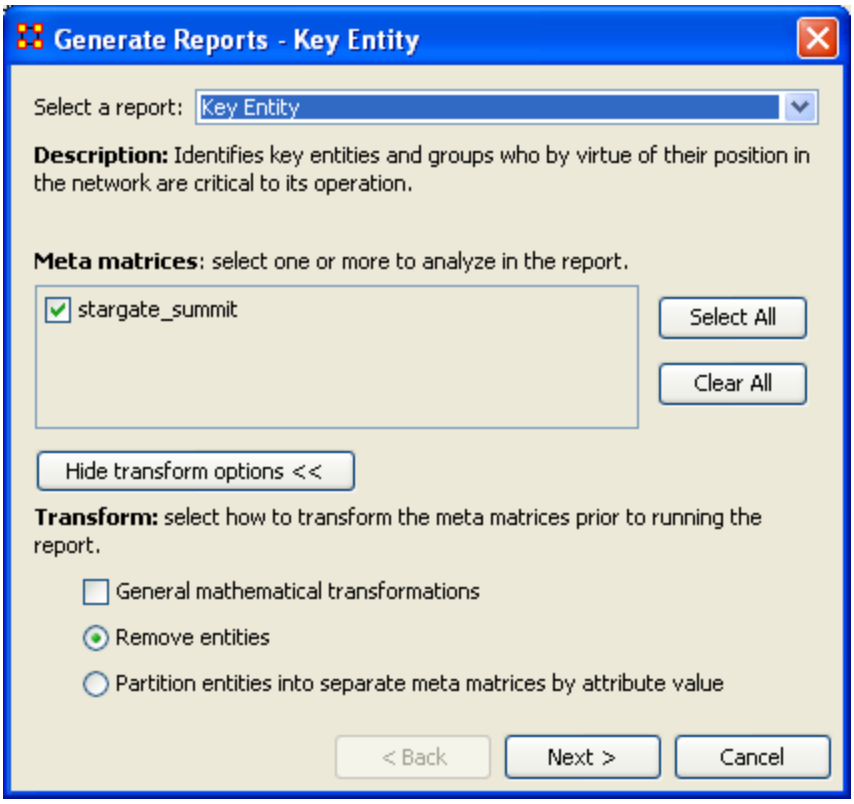


The last dialog box is for selecting what type of format for the final reports and the directory to place them. **Text** will create reports that will appear in **Panel 3** of the interface, **HTML*** creates reports that will open up your browser, and **CSV*** creates files that are usable in ORA. The bottom section allows you to navigate to a directory where you want to save your files.

Remove Nodes from a Key Entity Report:

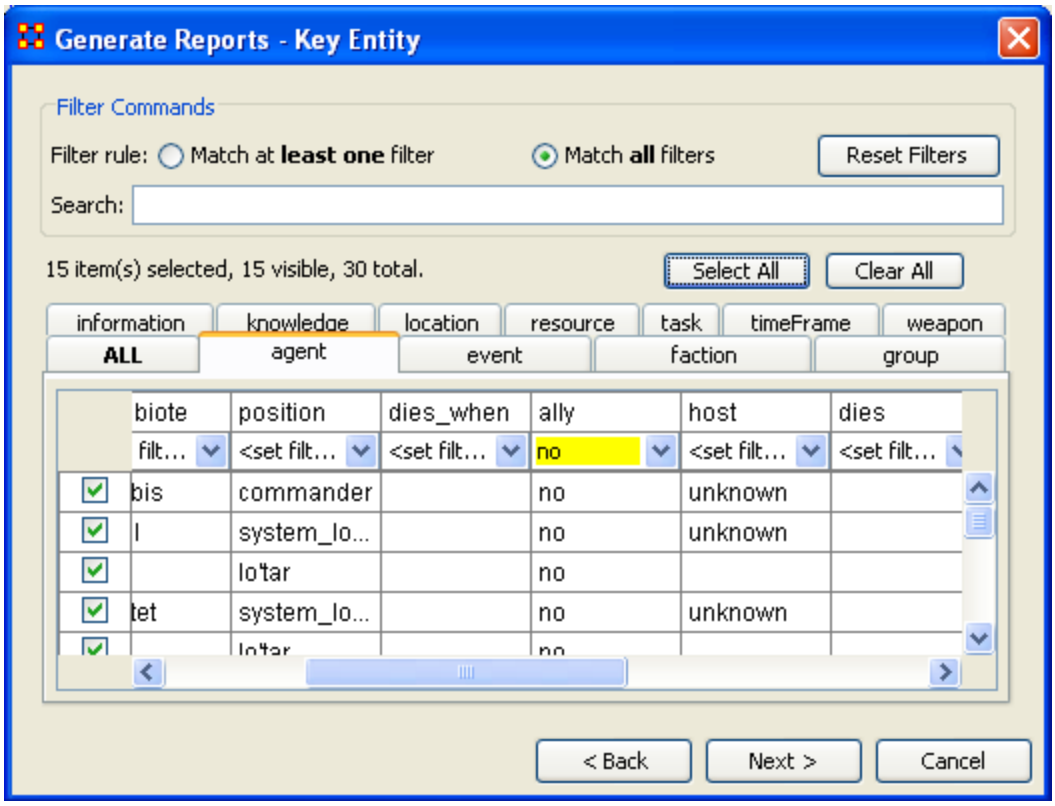
Next we'll look at removing nodes from the report. The network **Stargate: Summit** contains both the friends and foes in the scenario. But say you only want to see only how the **friendly agents** interacted. Being that there's an **ally** attribute this will make it simple to eliminate the **foe agents**.

Follow the same procedure as above except click in the **Remove entities** radio button.



In this example we're going to eliminate a portion of the network before we run the measures. Select the **Remove entities** button. Then select the **[Next >]** button at the bottom of the dialog box.

In this dialog box you can select exactly which nodes to remove.

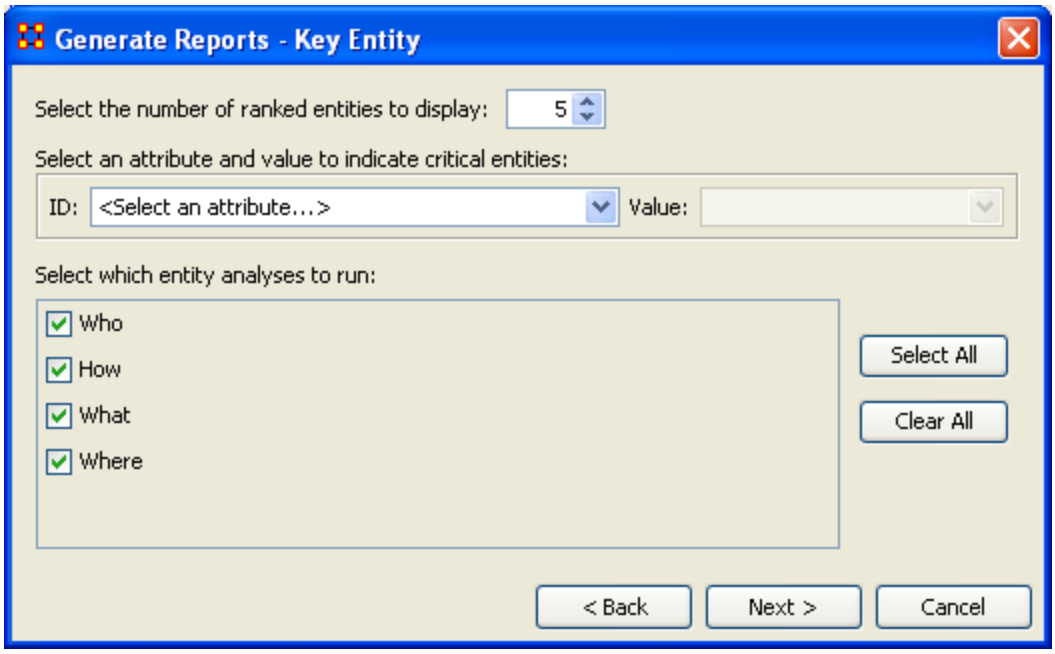


The top section, **Filter Commands**, allows you to create a **single filter** or compound them and force it to **Match all filters**.

The bottom sections contains tabs which further allow you to refine your filter. There is a tab for each nodeset in your network.

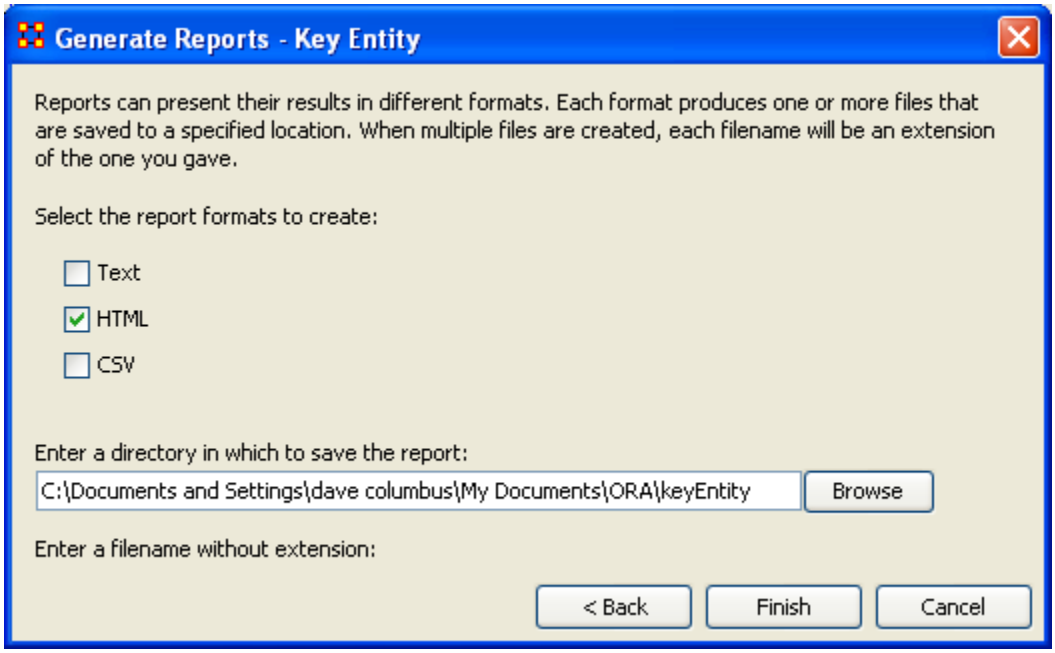
I only want to run the measures on the **Allies** so I select the **agent** tab, scroll over to the **ally** tab, and in the dropdown menu I select **no**. This will call up all the **non-ally** agents. I then click the **[Select All]** button which places a checkmark in each box effectively removing them from the network.

Click the **[Next >]** button.



The next dialog box is for selecting **the number of ranked nodes**, **critical attribute and values** and also for selecting **which reports** you want to view. I am only interested in the top five nodes in the network and place a **5** in the top box. I don't want to point out any particular attributes so I'll leave the textbox blank.

Click the **[Next >]** button.



The last dialog box is for selecting what type of format for the final reports and the directory to place them. **Text** will create reports that will appear in **Panel 3** of the

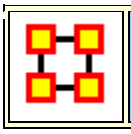
interface, **HTML*** creates reports that will open up your browser, and **CSV*** creates files that are usable in ORA. The bottom section allows you to navigate to a directory where you want to save all your files.

Comparison of the two reports

As the reports are rather large, let's compare a small portion of cognitive effort from the reports.

All agents			Allies-only		
Rank	Value	Agent	Rank	Value	Agent
1	**0.340911**	**jacob_carter_selmak**	**1**	**0.354626**	**jacob_carter_selmak**
2	**0.257479**	**ren'al**	**2**	**0.284762**	**daniel_jackson**
3	**0.248333**	**daniel_jackson**	**3**	**0.284218**	**ren'al**
4	**0.205698**	**olokun**	**4**	**0.166667**	**maj_samantha_carter**
5	**0.205698**	**morrigan**	**5**	**0.164218**	**teal'c**

The left-hand column shows all nodes, including the non-allies **olokun and morrigan**. But after eliminating the non-allies two friendly agents take their place. You'll also notice that **daniel_jackson and ren'al** swapped places. With various links removed, after eliminating the non-allies, the order of the remaining nodes can shift. It should also be noticed that the rating for jacob_carter_selmak has increased elevating his position as Emergent Leader.



Over-Time Analysis

The Reports

A **Key Entity Report** creates the following reports: central actors, organizations, central knowledge, resources, central events, tasks, central locations, and performance indicators.

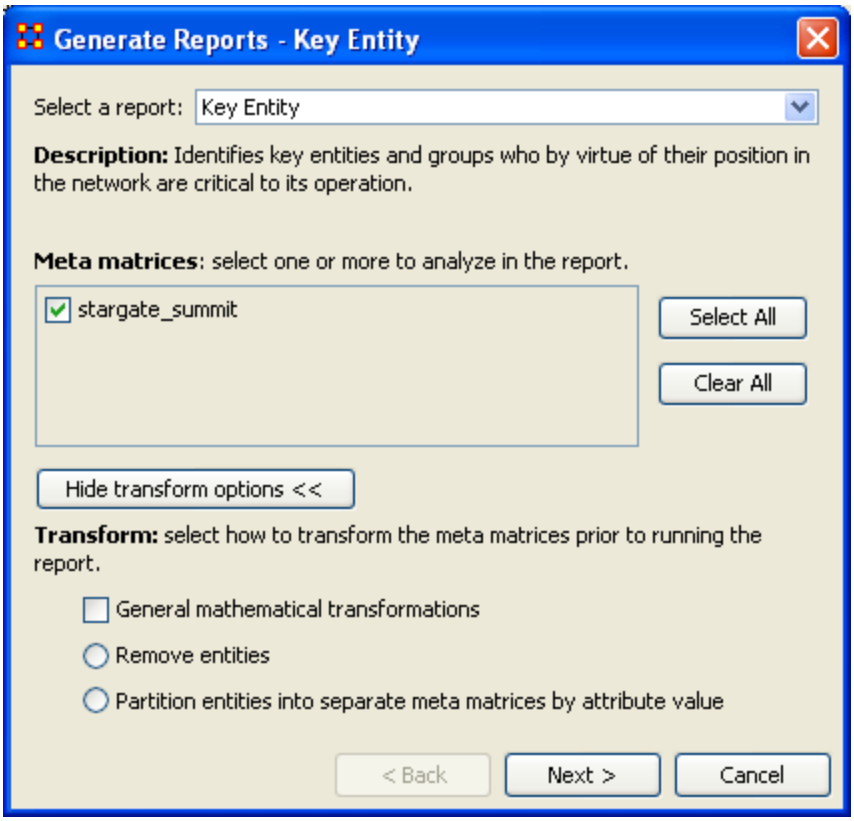
The Key Entity Report can either run its measures over the entire network or be refined or filtered to run them over only a select portion of the network.

More detailed information regarding the basic workings of the Key Entity Report screens can be found **Reports Section**.

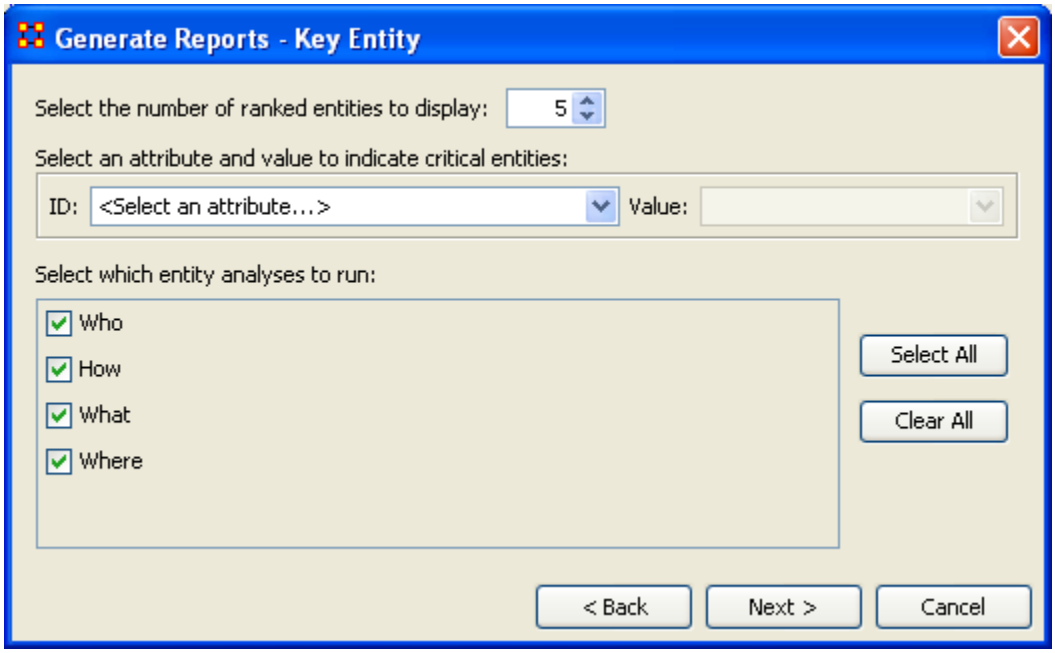
Running a Key Entity Report:

We'll be using the network **Stargate: Summit** contains all the agents involved in the scenario, friend and foe. The first report run will contain all the agents, friend and foe.

- From the main menu select **Analysis ⇒ Generate Reports** which brings up the **Generate Reports** dialog box.
- At the top of the window is a dropdown menu titled **Select a Report**. Pull down the menu by clicking the small inverted arrow icon to its right, and select **Key Entity**.
- In the box titled **Select one or more meta matrices:** select the network to run the report on.
- At the bottom of the box is the **Transform options**.
    - **General Mathematical Transformation :** Contains various formulas for manipulating a network.
    - **Remove Entities :** Remove node(s) from a network before running the measures.
    - **Partition entities into separate meta matrices by attribute value :** Create new networks based on your choice of nodes and attributes.



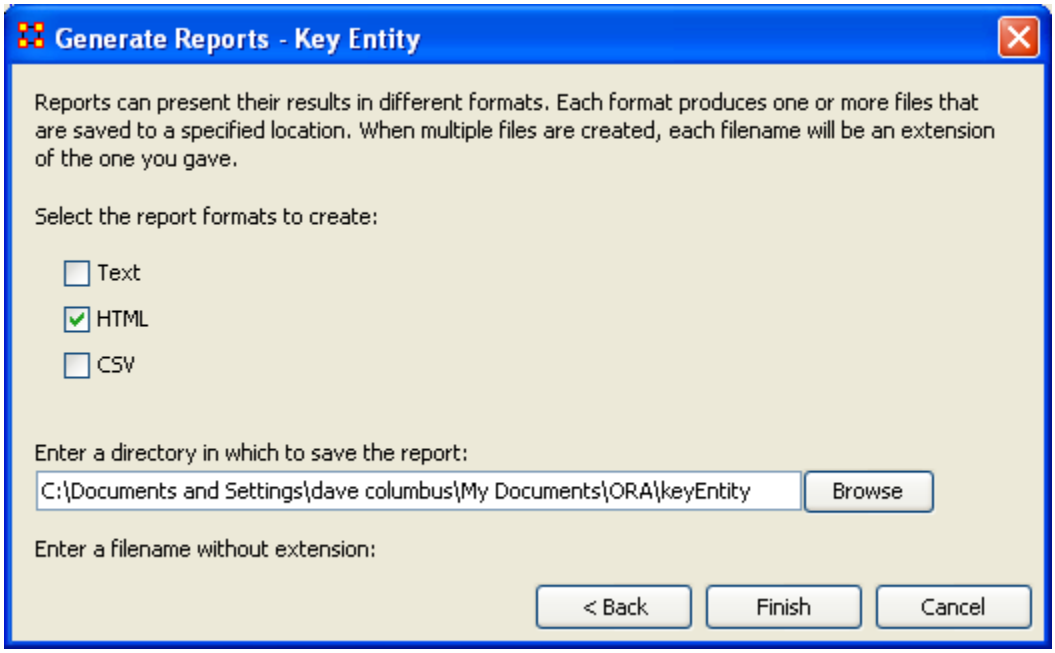
Select the **[Next >]** button at the bottom of the dialog box.



The next dialog box is for selecting **the number of ranked nodes**, **critical attribute and values** and also for selecting **which reports** you want to view. I am only interested in the top five nodes in the network and place a **5** in the top

box. I don't want to point out any particular nodes, only the friends, so I'll leave the textbox blank. I want all the reports run so I place a checkmark in all four boxes.

Click the **[Next >]** button.

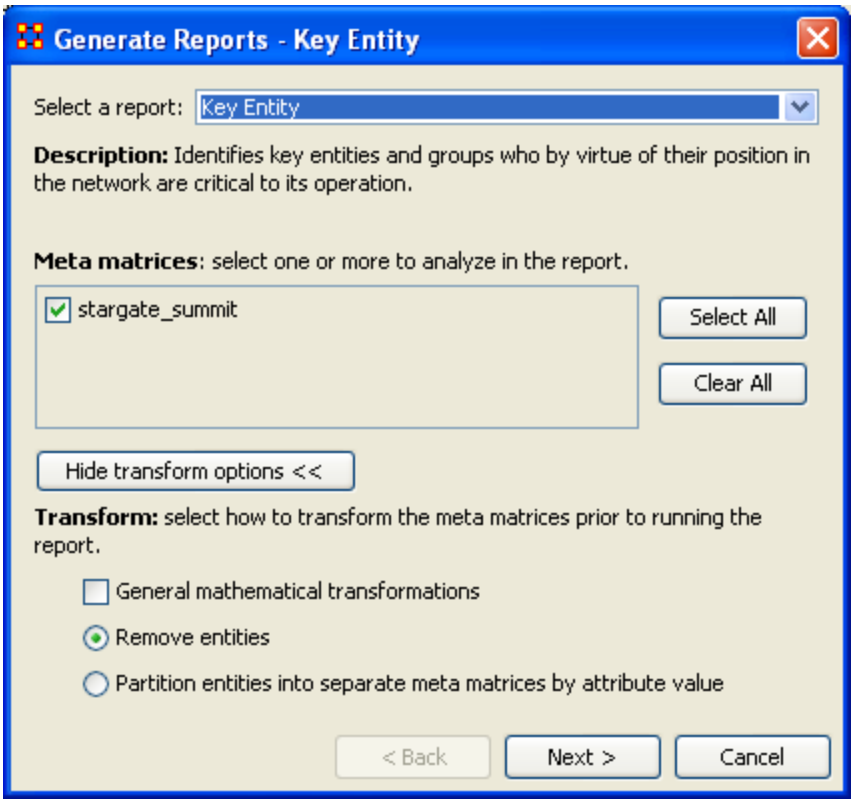


The last dialog box is for selecting what type of format for the final reports and the directory to place them. **Text** will create reports that will appear in **Panel 3** of the interface, **HTML*** creates reports that will open up your browser, and **CSV*** creates files that are usable in ORA. The bottom section allows you to navigate to a directory where you want to save your files.

Remove Nodes from a Key Entity Report:

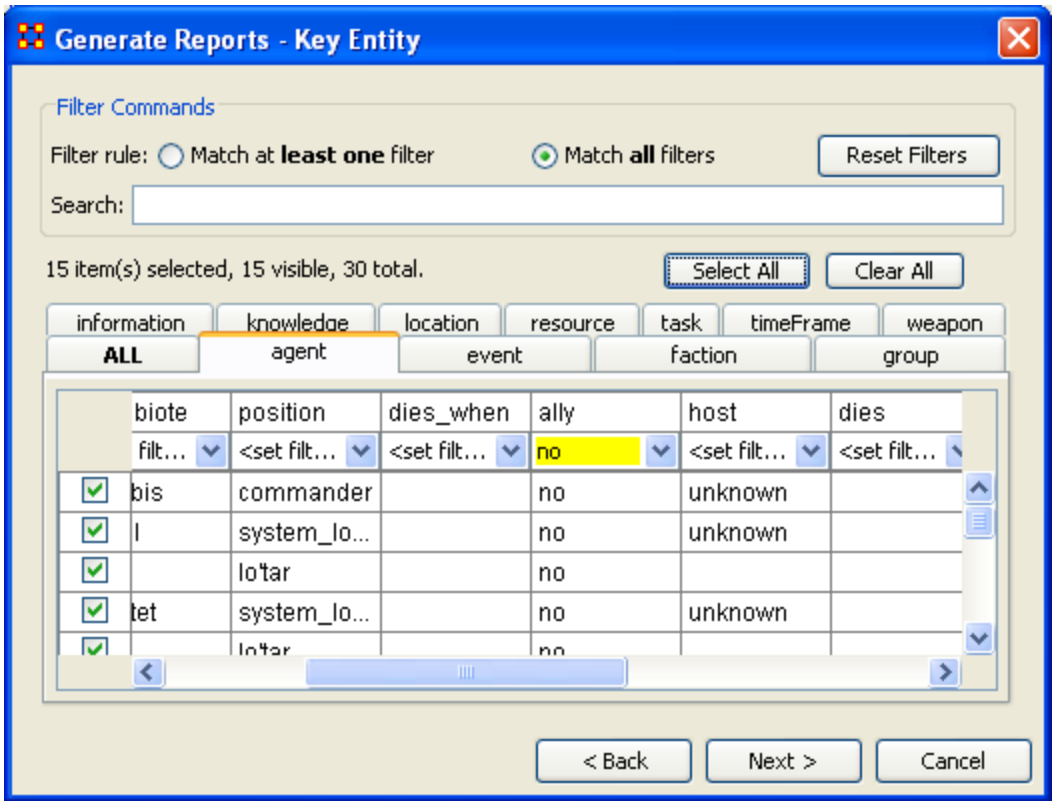
Next we'll look at removing nodes from the report. The network **Stargate: Summit** contains both the friends and foes in the scenario. But say you only want to see only how the **friendly agents** interacted. Being that there's an **ally** attribute this will make it simple to eliminate the **foe agents**.

Follow the same procedure as above except click in the **Remove entities** radio button.



In this example we're going to eliminate a portion of the network before we run the measures. Select the **Remove entities** button. Then select the **[Next >]** button at the bottom of the dialog box.

In this dialog box you can select exactly which nodes to remove.

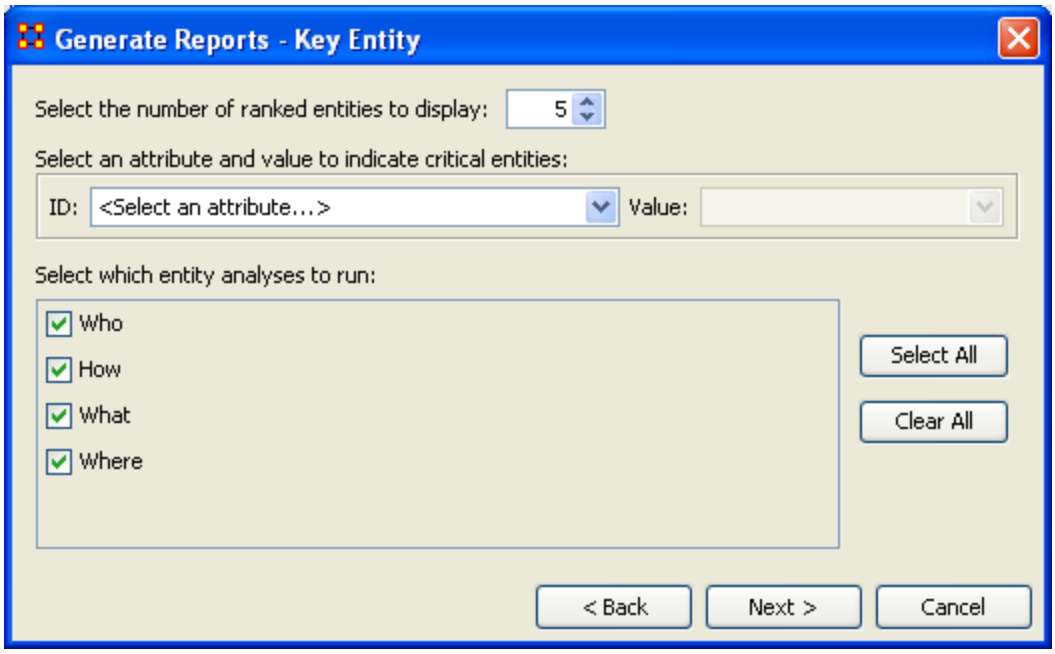


The top section, **Filter Commands**, allows you to create a **single filter** or compound them and force it to **Match all filters**.

The bottom sections contains tabs which further allow you to refine your filter. There is a tab for each nodeset in your network.

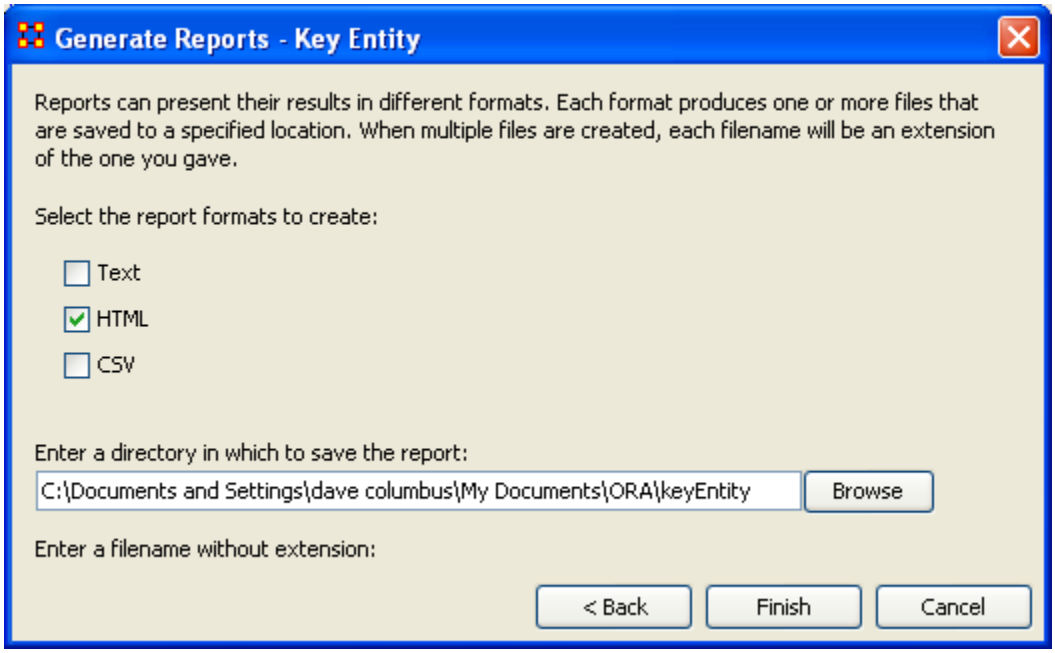
I only want to run the measures on the **Allies** so I select the **agent** tab, scroll over to the **ally** tab, and in the dropdown menu I select **no**. This will call up all the **non-ally** agents. I then click the **[Select All]** button which places a checkmark in each box effectively removing them from the network.

Click the **[Next >]** button.



The next dialog box is for selecting **the number of ranked nodes**, **critical attribute and values** and also for selecting **which reports** you want to view. I am only interested in the top five nodes in the network and place a **5** in the top box. I don't want to point out any particular attributes so I'll leave the textbox blank.

Click the **[Next >]** button.



The last dialog box is for selecting what type of format for the final reports and the directory to place them. **Text** will create reports that will appear in **Panel 3** of the

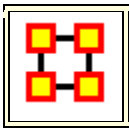
interface, **HTML*** creates reports that will open up your browser, and **CSV*** creates files that are usable in ORA. The bottom section allows you to navigate to a directory where you want to save all your files.

Comparison of the two reports

As the reports are rather large, let's compare a small portion of cognitive effort from the reports.

All agents			Allies-only		
Rank	Value	Agent	Rank	Value	Agent
1	**0.340911**	**jacob_carter_selmak**	**1**	**0.354626**	**jacob_carter_selmak**
2	**0.257479**	**ren'al**	**2**	**0.284762**	**daniel_jackson**
3	**0.248333**	**daniel_jackson**	**3**	**0.284218**	**ren'al**
4	**0.205698**	**olokun**	**4**	**0.166667**	**maj_samantha_carter**
5	**0.205698**	**morrigan**	**5**	**0.164218**	**teal'c**

The left-hand column shows all nodes, including the non-allies **olokun and morrigan**. But after eliminating the non-allies two friendly agents take their place. You'll also notice that **daniel_jackson and ren'al** swapped places. With various links removed, after eliminating the non-allies, the order of the remaining nodes can shift. It should also be noticed that the rating for jacob_carter_selmak has increased elevating his position as Emergent Leader.



Working with Attributes

What is an attribute?

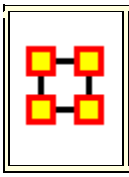
An **attribute** is a quality, an added description, a differentiation of some sort, of a Who, What, Where, How and When and Whatever. It also indicates the presences, absence or strength of a particular connection. As an example, you might create a network of people (Whos) who work at certain buildings (Locations). The **attributes** of those people could range anywhere from their

first and last name, their employee identification number, their job grade in the corporation, their salary, their home phone number, education, political affiliation and the list goes on. Moreover, we might say that you have a connection to both your friend and father. However, we might give the connection to your father the attribute of **family** whereas your friend might be attributed **personal**. The key is to know that attributes can be both differentiate nodes or ties or both.

It follows that it would be helpful to view a network of Whos (and or any of the other node classes) and see how those Whos are grouped according to any particular attribute you are interested in analyzing. ORA has the capability to do just that and provides several ways of doing so. We will explore several methods of locating groups namely by using ORA's report tool and in the Visualizer.

>> **Go to Using attributes to find groups in ORA Reports**

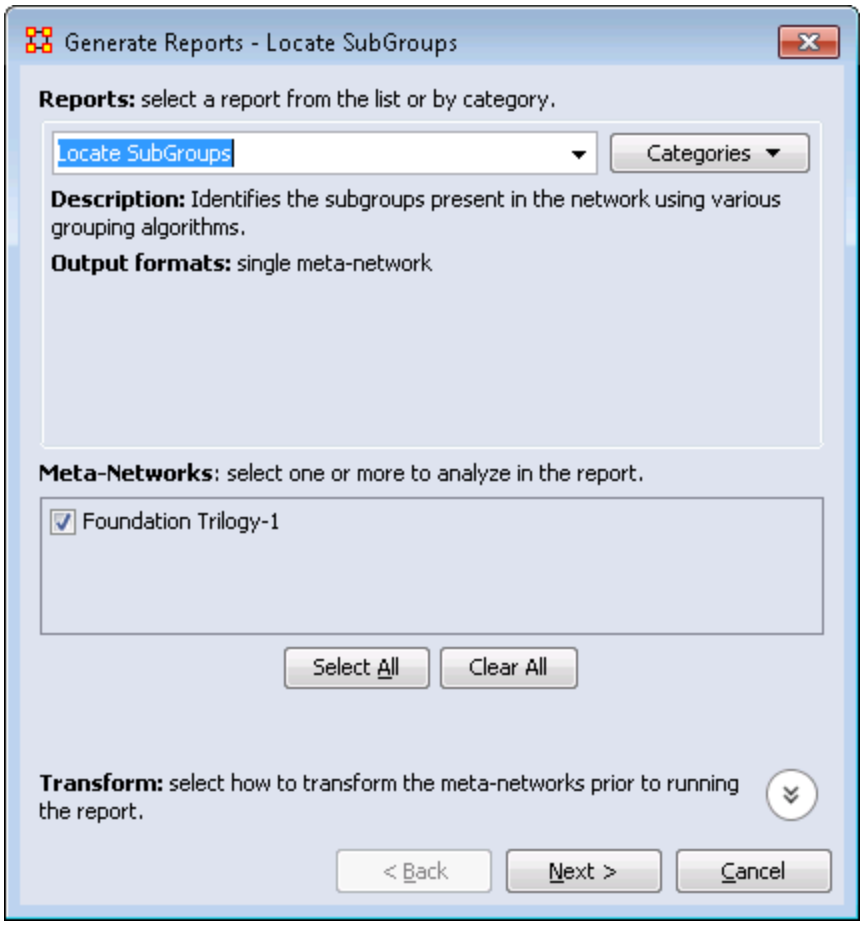
>> **Go to using attributes to find groups in the ORA Visualizer**



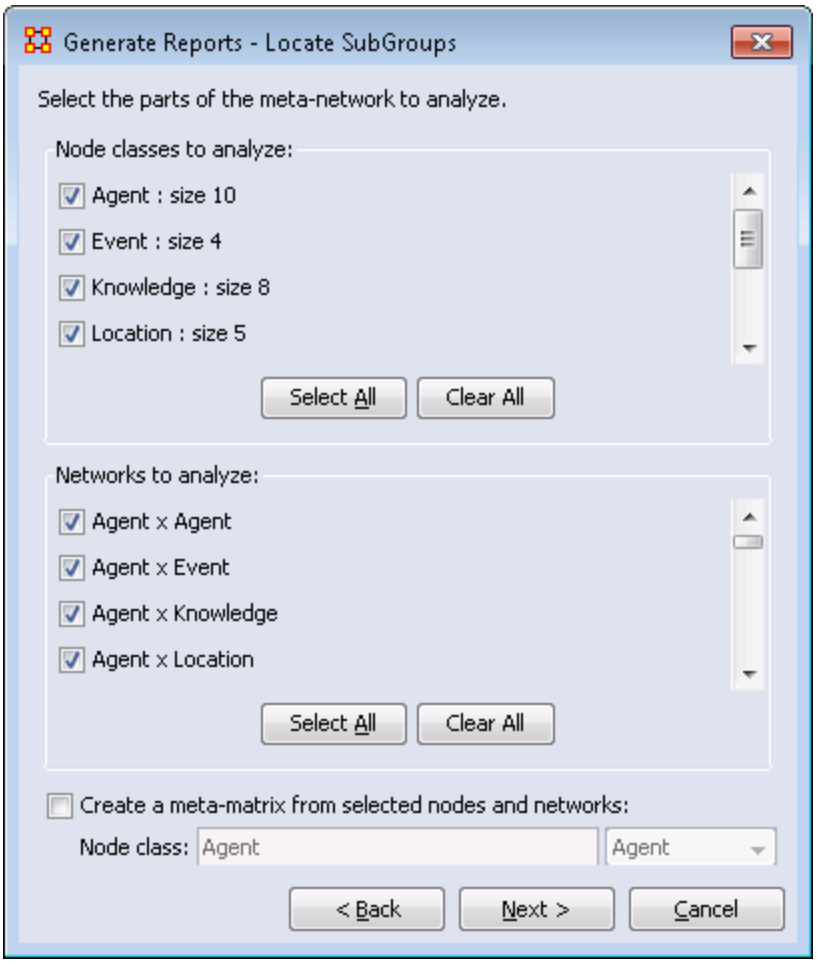
Using Attributes to find groups in ORA Reports

To **create and assess groups by attribute** use the **Locate Subgroups report** accessible in ORA Reports at the following path:

From the Main Menu select **Analysis > Generate Reports > Characterize Groups and Networks > Locate SubGroups**. In the dialog box place a check mark next to the Meta-Network to analyze and click [**Next >**].



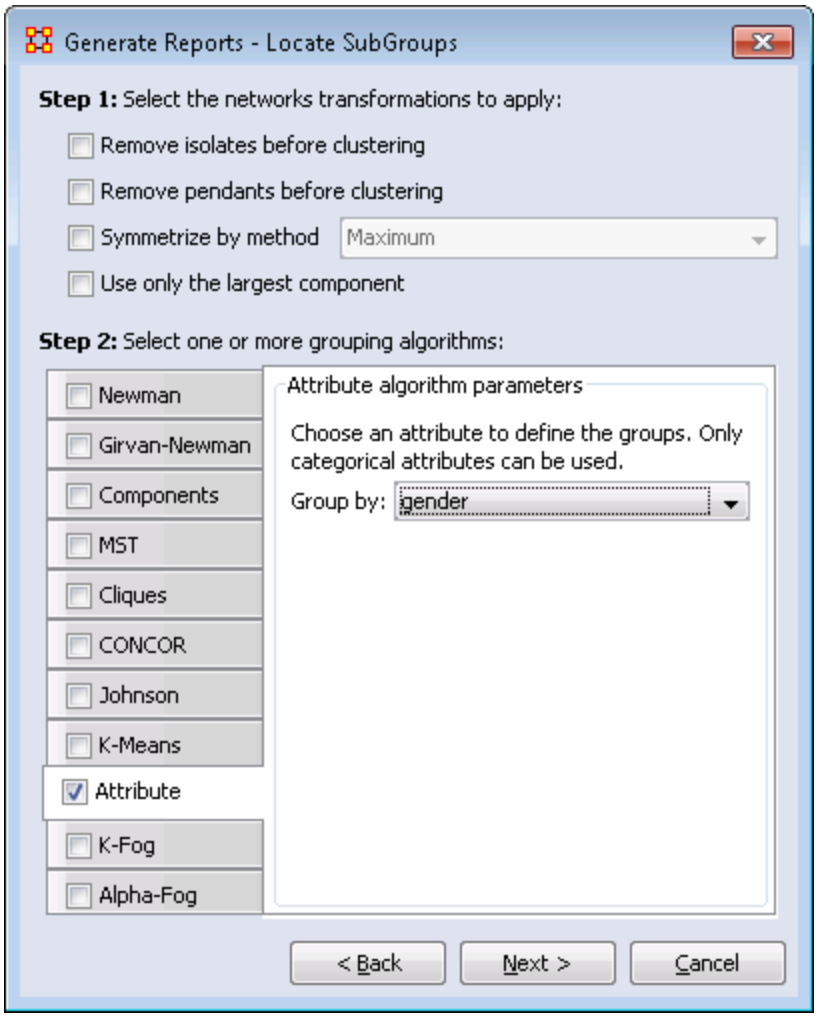
By default all NodeClasses and Networks are check marked. Remove the check mark for any you do not wanted included in the analysis. Then click [**Next >**].



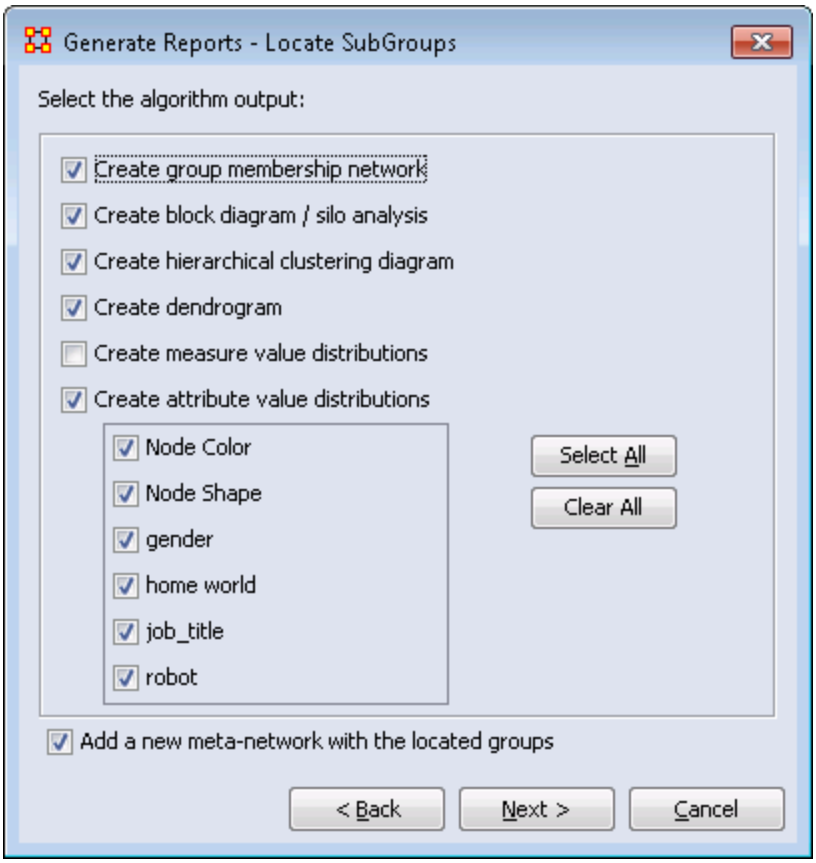
Click the side tab **Attribute**. Be sure to place a check mark next to the algorithm's name. From the dropdown menu select an attribute to use. Then click [**Next >**].

In **Select the networks transformation to apply:**you can specify removal of isolates and pendants, symmetirize method, and selecting only the largest component.

In **Select one or more grouping algorithms:**you select one or more analytic methods. Place a check mark next to the name and fill in the parameters.



Place a check mark next to any output parameters to need. Then click [**Next >**].



On the final screen click the [**Browse**] button and navigate to a directory to save the results. Give it a unique prefix in the second box. Then click [**Finish**].

A new Meta-Network will be created that contains the networks used in the grouping. This new Meta-Network will contain a new NodeClass, **attribute groups** and new Networks, **NodeClass x attribute groups** is created that contains the group nodes. Also two block model group x group networks are created.

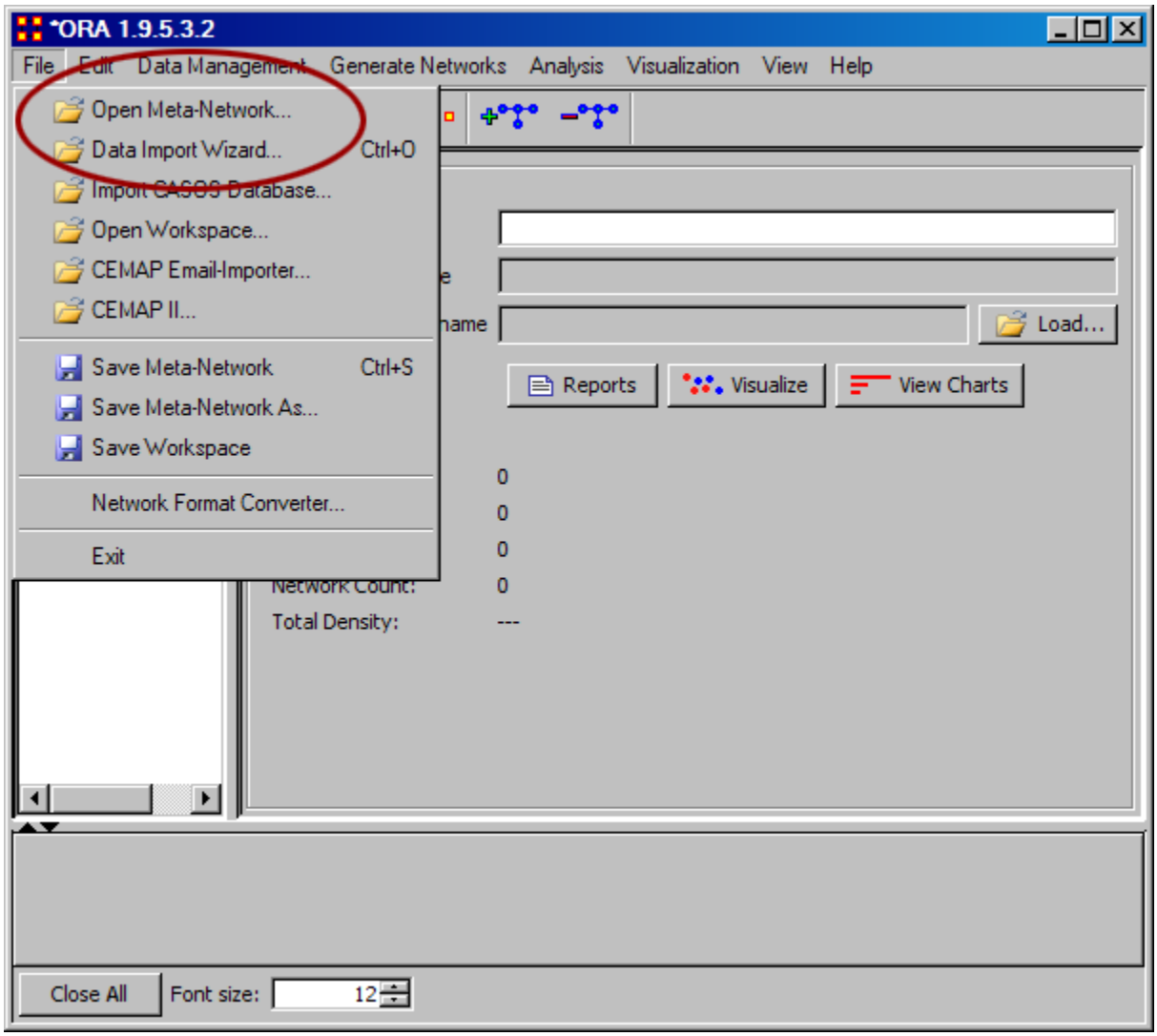
==========

In **Select the algorithm outout:** you can select the specific grouping algorithm parameters. Each of these parameters will give additional output in the report.

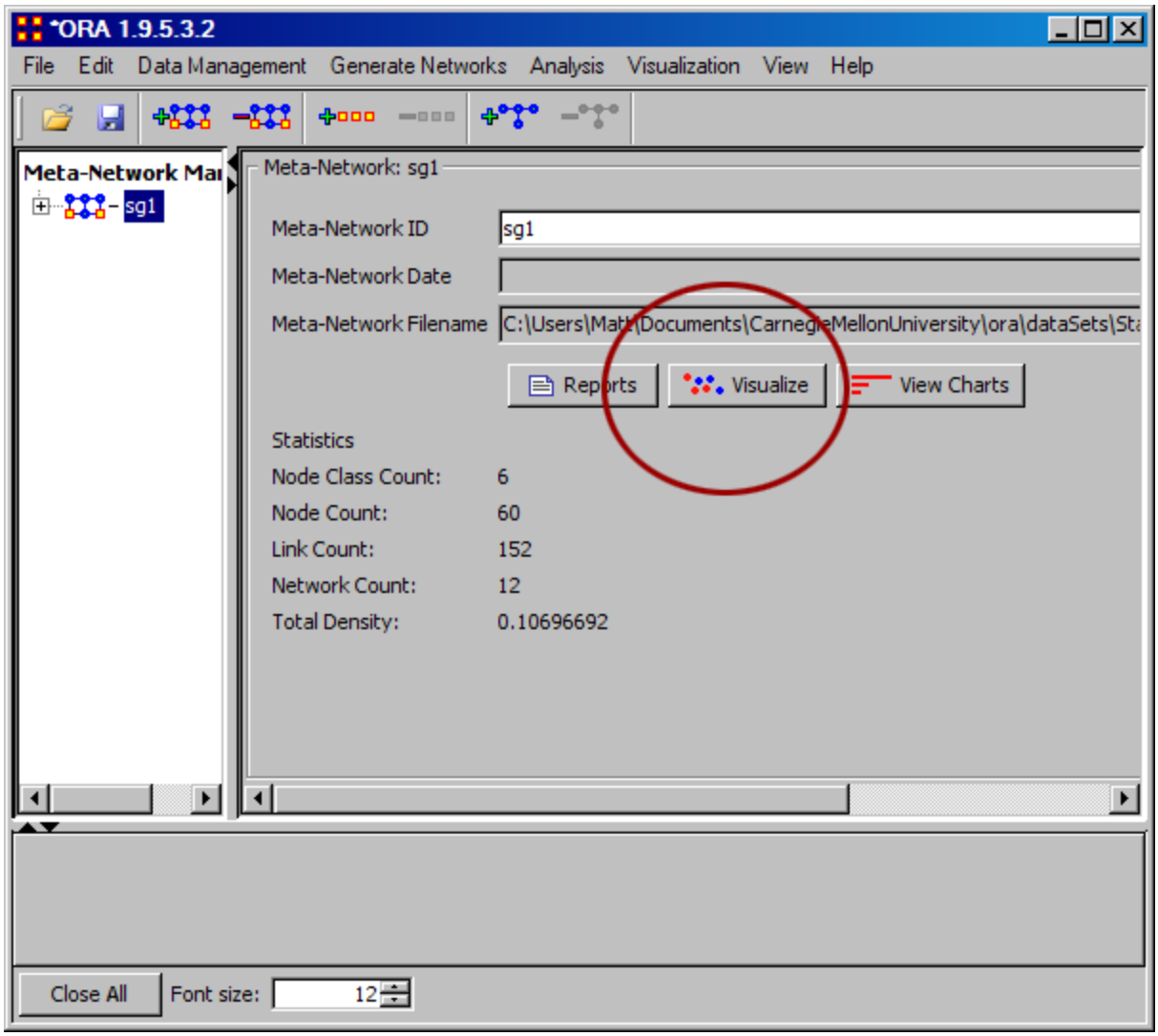
Using Attributes to find groups in the Visualizer

What follows are instructions for finding various groups that may exist in your Meta-Network by using attributes and the ORA Visualizer too. To follow along with this lesson, please load the SG1 data set included with your installation.

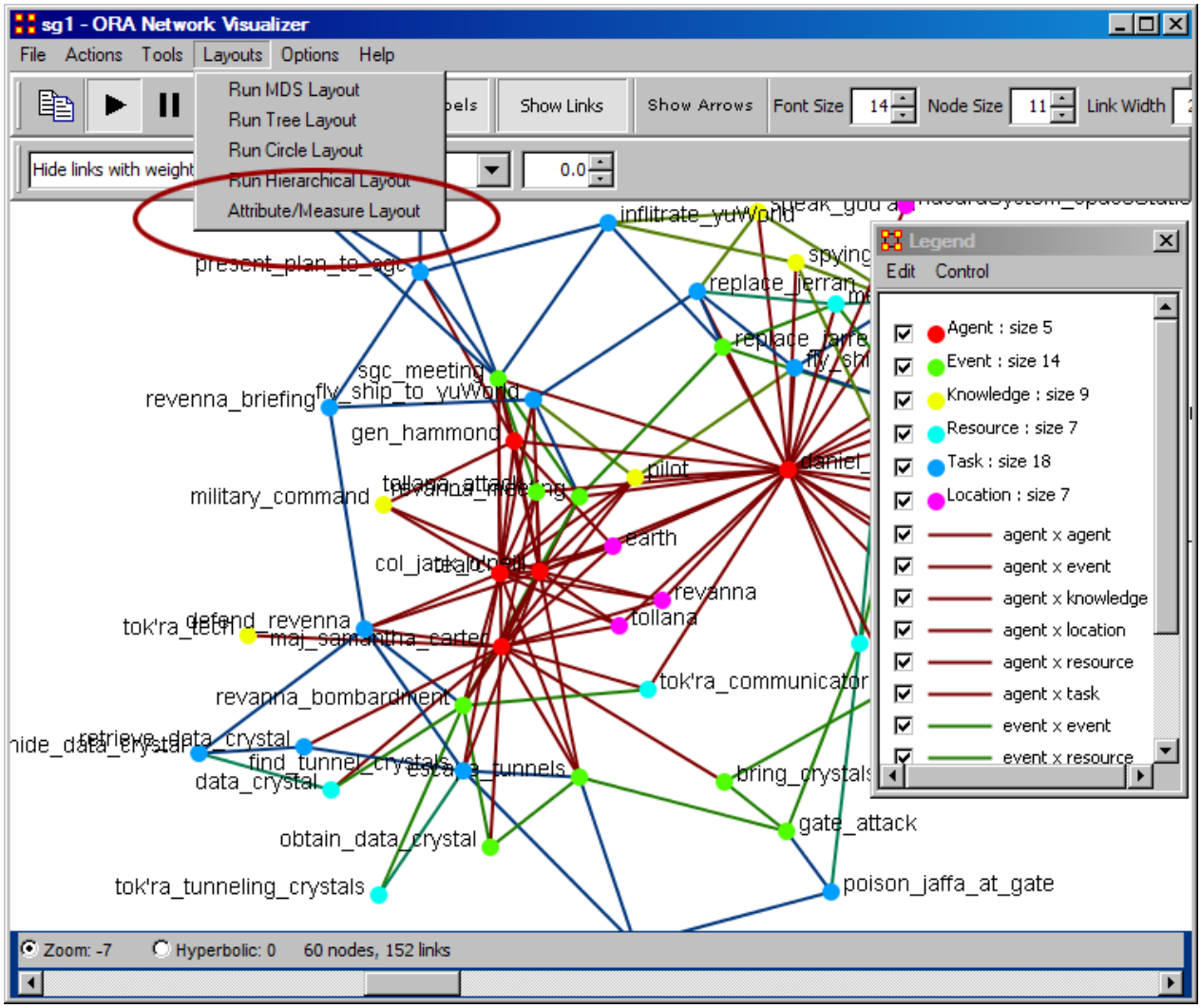
Step 1: Open the Stargate Meta-Network.



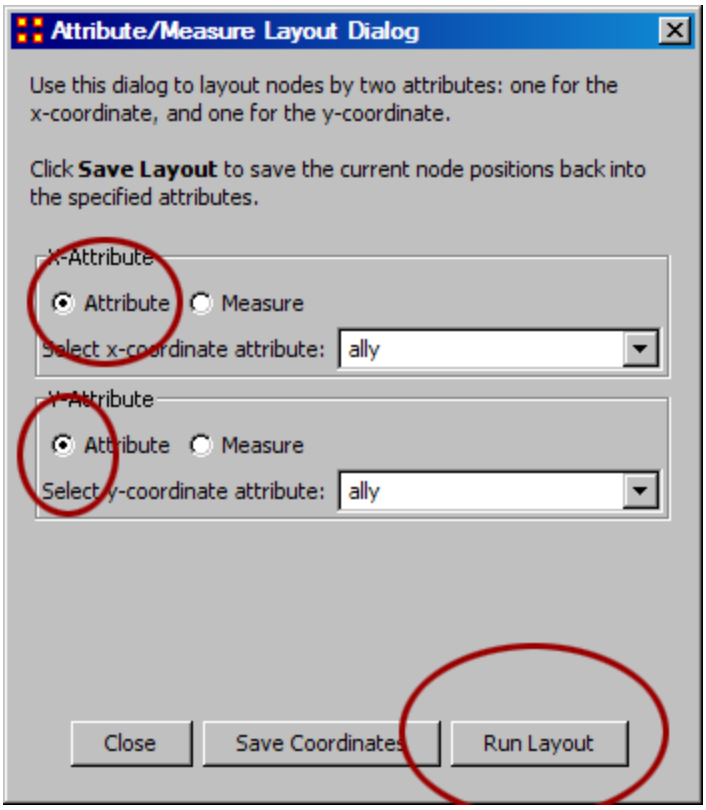
Step 2: Select [Visualizer] button.



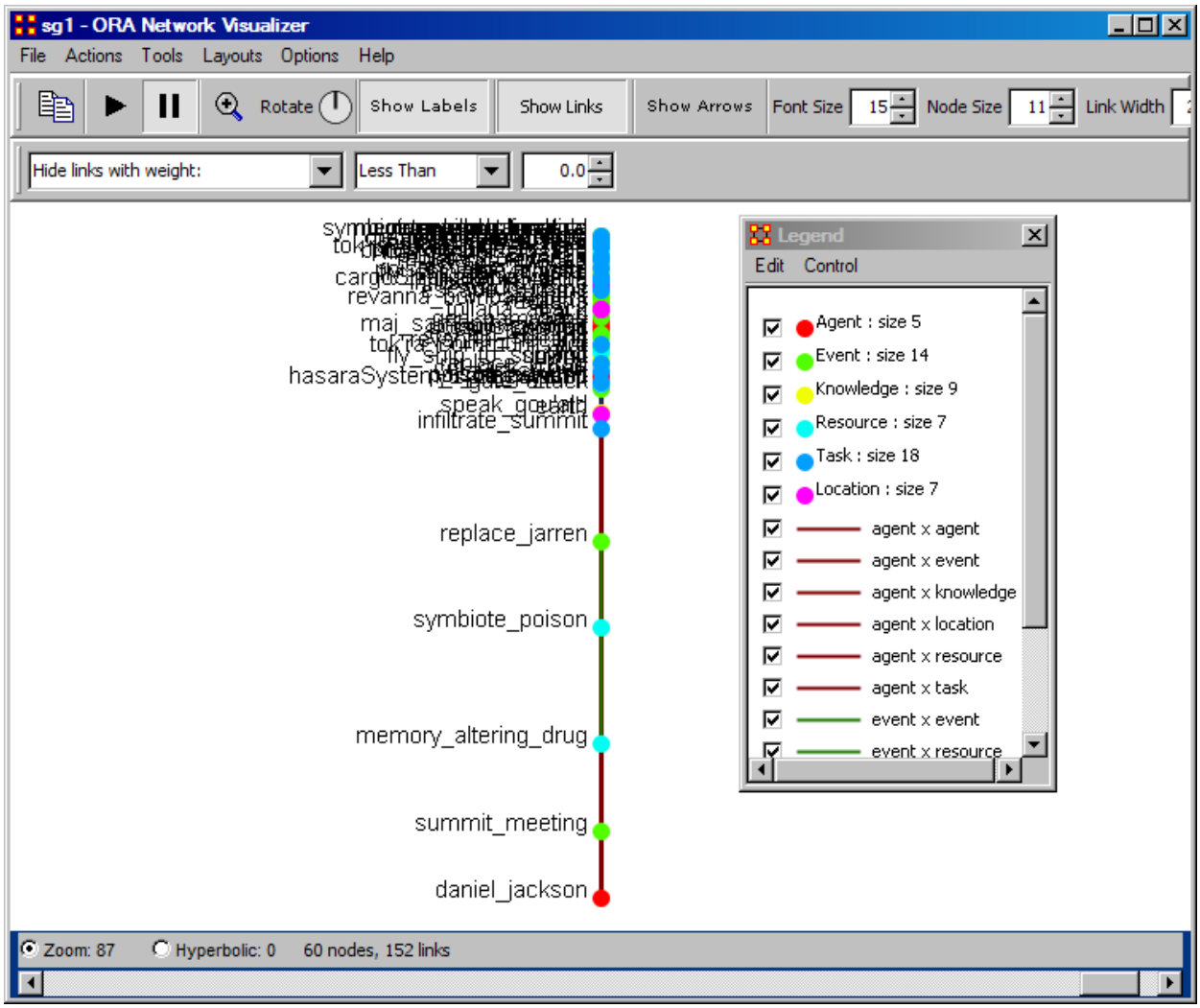
Step 3: In The Visualization, select "Attribute / Measure" Layout.



Step 4: Next (screen shot below) you will see the "Attribute / Measure" Layout Dialog box appear. In this box, select the attribute for an X and Y coordinate. You can use the save button to come back to these settings later. After choosing your attributes, click "Run Layout."



Step 5: You can experiment with the X and Y values by using either attributes or measures. In the final result shown below, we choose to use the X value as an attribute and the Y values as a measure.



Working with Loom Clustering

Loom allows you to view nodes over time and which locations these nodes visited.

NOTE : *This does require a dataset with a time attribute.*

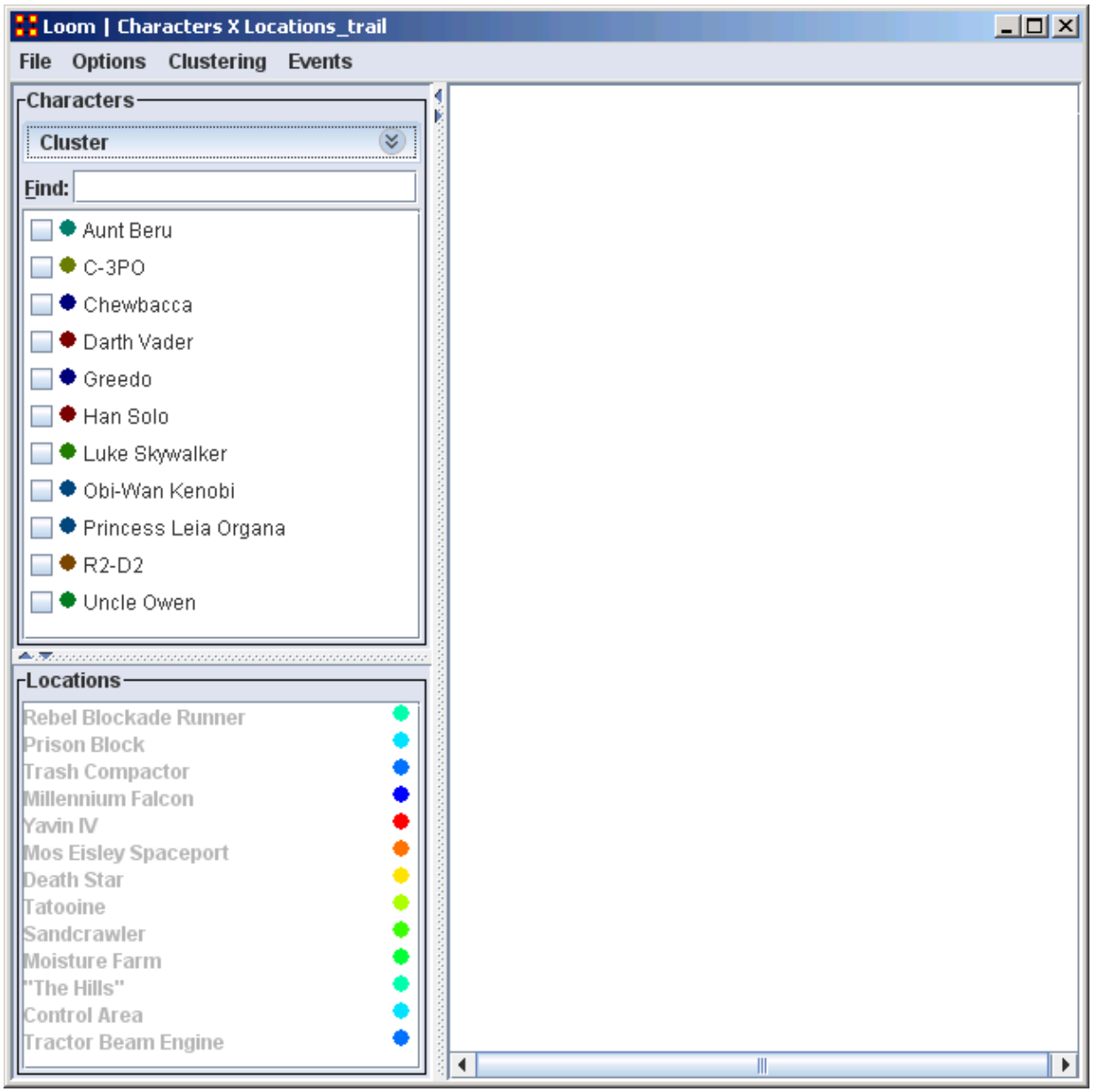
Loading the Star Wars dataset

For this example we will be using the Star Wars dataset included in the sample folder. You can find it in the following folder: **ORA > sample data > Loom data > Star Wars**. There will be 24 xml files. From the main menu select **File > Open Meta-Network...**. Navigate to the folder specified above. Select the first file then Shift-Click the last file to select them all. Then select [**Open**]. This will display them in the Meta-Network panel.

Trail pattern length determines which clusters will be shown.

To open this data in Loom make sure all Meta-Networks are selected. From the drop down menu select **Visualizations > View Trails**. You will be asked to chose a network. For this dataset chose **Characters x Location**. On the left will be two panes. On top is a list of Characters and below that is a list of locations.

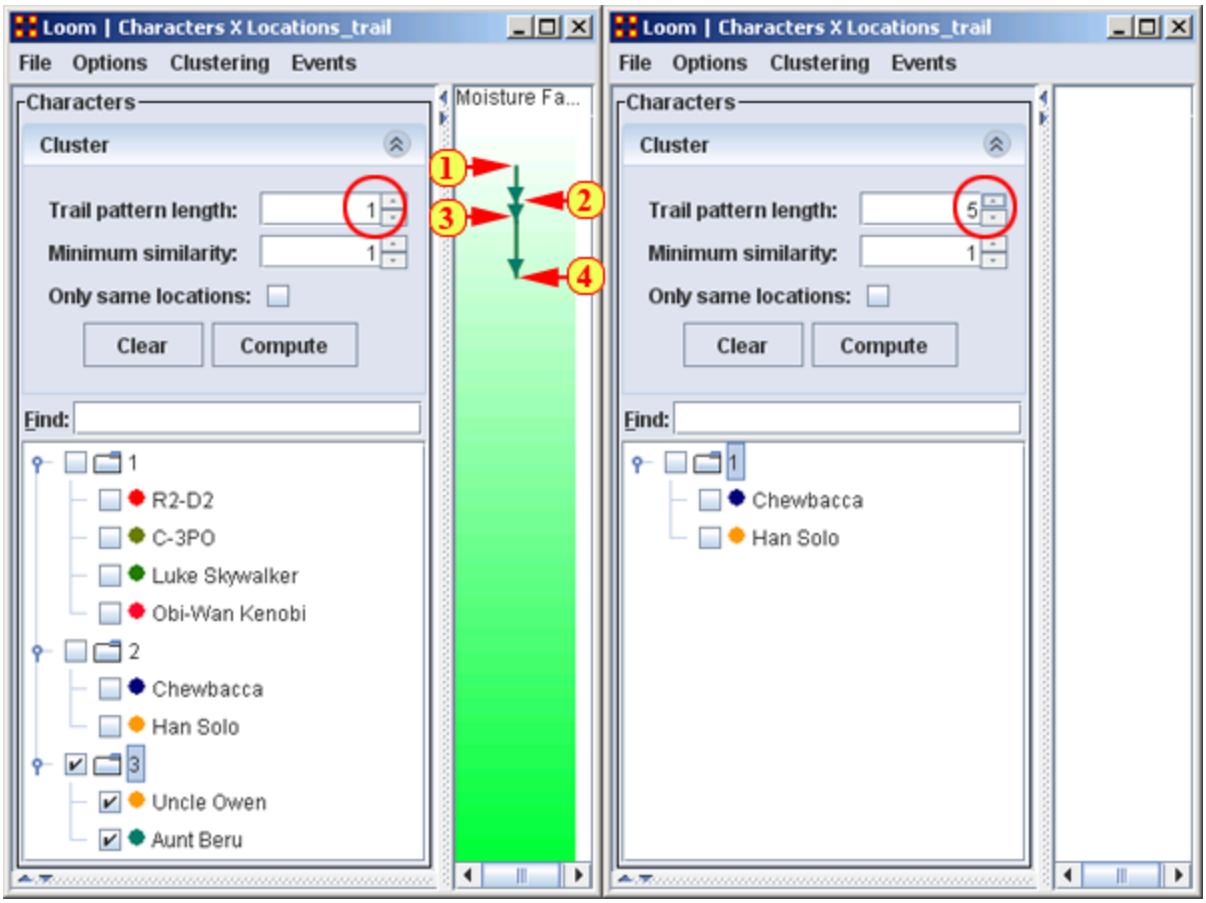
After opening the dataset in Loom all the characters will appear in the left/top pane and will start with no nodes checked. Below are the locations and the colors which will signify them on the Loom.



Trail pattern length

Trail pattern length displays clusters of nodes which have the same general trail. The number is the minimum number of points they all need to have in common.

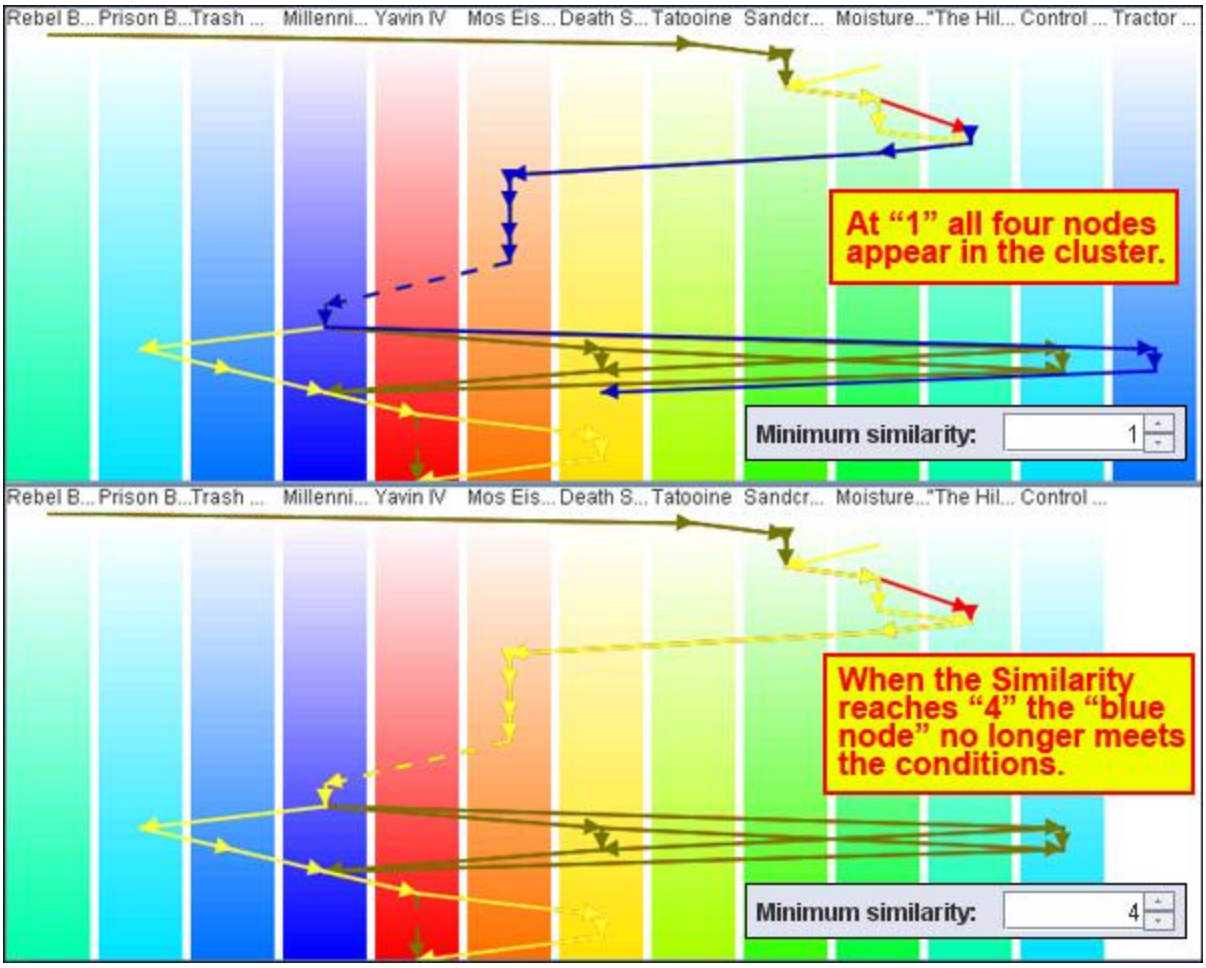
Uncle Owen and Aunt Beru are in [4] timeslices. They will continue to be clustered until the **Trail pattern length** reaches [5]. At that point they no longer meet the conditions and are no longer clustered.



Minimum Similarity

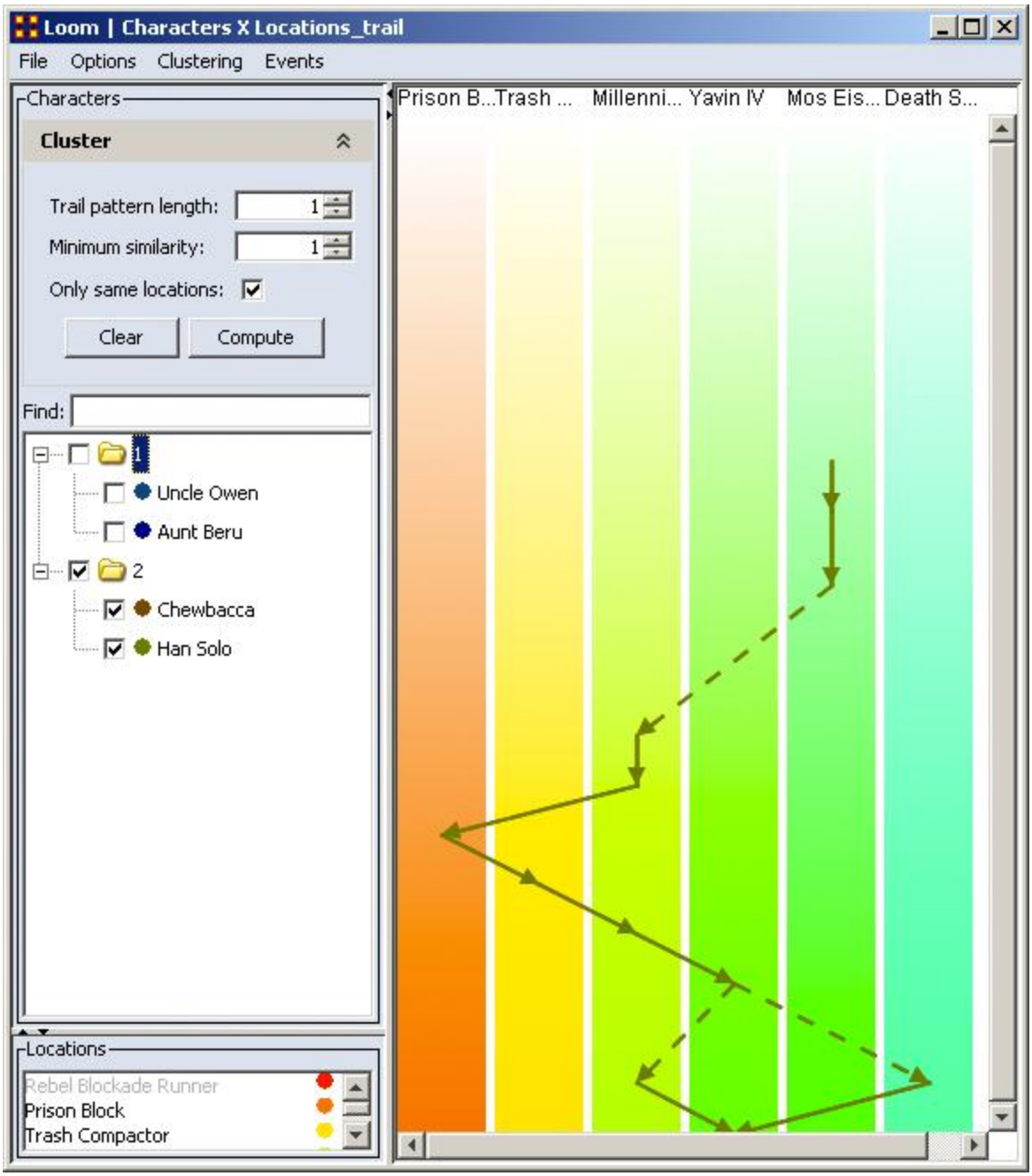
This is the minimum number of [continuous] points that nodes need to have in common to be clustered. Whenever a node falls under this number it is dropped from the cluster.

Here **R2-D2**, **C-3P0**, **Luke Skywalker**, and **Obi-Wan Kenobi** are clustered. When the Minimum Similarity reaches four Obi-Wan drops out of the cluster when he leaves for a different location.



Only Same Location

With this check box checked only nodes with **all the same locations** will be clustered. The Star Wars dataset has two clusters where nodes were in all the same locations for all timeslices **Uncle Owen and Aunt Beru** and **Chewbacca and Han Solo**. The display below shows the route of **Han Solo and Chewbacca**.


Loom | Characters X Locations_trail
File
Options
Clustering
Events
Characters
Cluster
Trail pattern length:
1
Minimum similarity:
1
Only same locations:
Clear
Compute
Find:
1
Uncle Owen
Aunt Beru
2
Chewbacca
Han Solo
Locations
Rebel Blockade Runner
Prison Block
Trash Compactor
Prison B...
Trash ...
Millenni...
Yavin IV
Mos Eis...
Death S...

AutoMap - Lessons Starter

Lessons Starter

1. **Your First GUI Run**
2. **Text Encoding**
3. **Using a Concept List**
4. **Data Collection**
5. **Using a Delete List**
6. **Using a General Thesaurus**
7. **Compare Concept Lists**
8. **Compare Thesauri**
9. **Remove Items**

First Run with the GUI

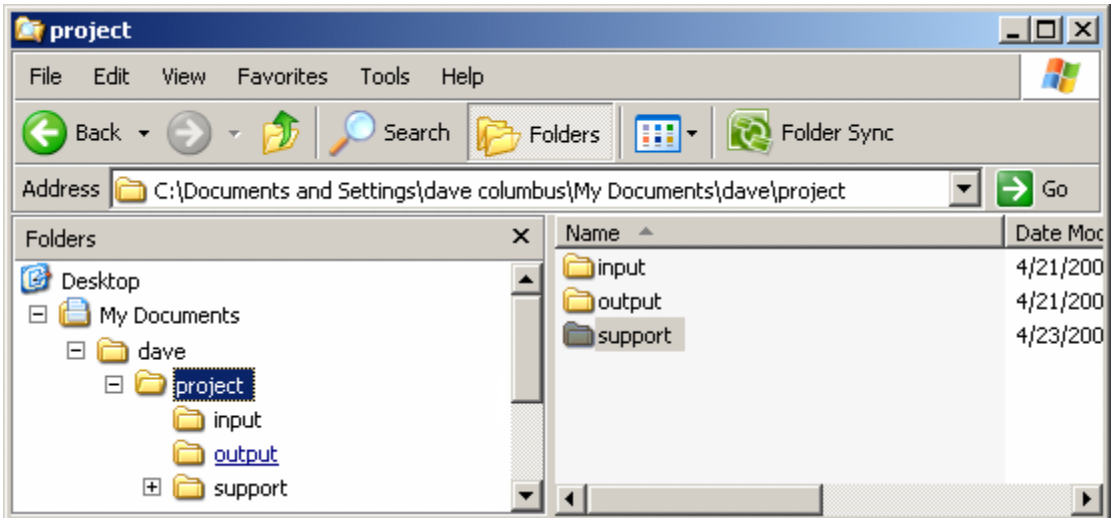
Description

This is an overview of your first run of AutoMap3. It is not an all-inclusive view of AutoMap but will cover the, more or less, necessary basics.

Procedure

1. Create Workspace

A good starting point is creating a project directory, a place where all your input files and output files will reside. This helps prevent files from getting lost. One suggestion is to create a top level project directory and create input and output directories within that directory. I also create a directory to place all support files such as Delete Lists and all the Thesauri.



Place all your input files into the **input** directory. Place any Delete Lists, Thesauri and other files to be used in the **support** directory. Direct all your results to the **output** directory.

2. Preparing Your Files

Files can come from any source. But to use in AutoMap3 they must be .txt files. Files in a **Word** format or **html** files will not be accepted into AutoMap. Any of these formats must be re-saved as a **.txt** format. This could be as simple as re-saving the file in the correct format to doing a copy-and-paste of the text into a text editor.

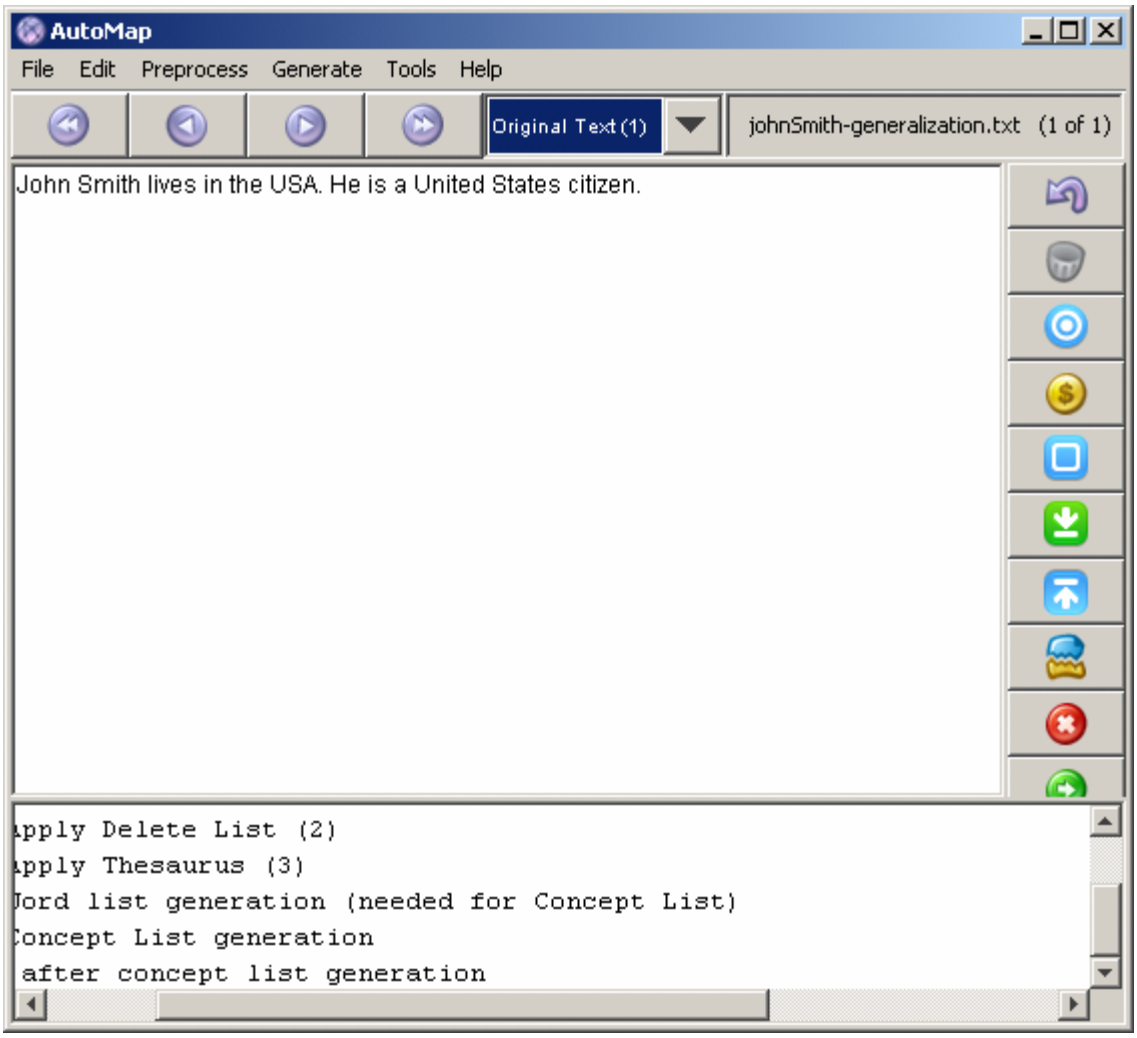
NOTE : *AutoMap accepts a variety of text encodings but they must be in a .txt format.*

3. Load your files into AutoMap

Once the text files are in the correct format they can be loaded into AutoMap. From the Pull Down Menu select ***File = Select Input Directory*** and navigate to the directory where you placed your text files. The first of these files will appear in the main window.

usCitizen.txt

```
John Smith lives in the USA. He is a United States citizen.
```



4. Decide on the Preprocessing Functions to use

Functions from the **Preprocessing Menu** affect all loaded text. None of these functions create any output files (though some require externally created files to work). These functions **remove excess concepts** (e.g. Remove Punctuation, Numbers, extra white spaces, or Symbols) or **modify concept names** (e.g. Thesauri for creating key_concepts) for easier generation and post-processing functions.

5. Creating a Generalization Thesaurus

Many people, places and things can be known by a variety of different formats of their names. A General Thesauri helps consolidate these various names under one unifying term. Below is an example. The format is **concept,key_concept**. Concept can be one or more words but key_concept must be one single word which can use the underscore.

usCitizenGenThes.csv

```
John_Smith,John_Smith
United_States,United_States_of_America
USA,United_States_of_America
```

NOTE : *The Thesaurus changes both the 2nd and 3rd concepts to the key_concept* ***United_States_of_America****.*

Create this file in a text editor or spreadsheet program and save it as a **.csv** file.

6. Apply a Generalization Thesaurus

From the Pull Down Menu select ***Preprocess => Apply Generalization Thesauri*** and navigate to your Generalization Thesaurus. At the Adjacency dialog box select **Rhetorical**. After applying the text will change to reflect the application of the thesaurus.

Text after General Thesauri applied

> **John_Smith** lives in the **United_States_of_America**. He is a **United_States_of_America** citizen.

7. Edit your General Thesauri

After applying a Thesaurus the list can be altered by selecting from the Pull Down Menu ***Tools => Thesauri Editor***.

8. Delete Extra/Unneeded Concepts

Texts usually have many extra concepts, or noise, that are not relevant to the semantic connections. A Delete List removes those extra words. From the Pull Down Menu select ***Preprocess => Apply Delete List*** and navigate to the Delete List you want to use. The text in the main will change to reflect the application of the Delete List.

usCitizenDeleteList.txt

```
in
the
is
a
```

Text after Delete List with rhetorical adjacency

> John Smith lives **xxx xxx** USA. He **xxx xxx** United States citizen.

9. View and Alter Delete Lists

After creating Delete List you may want to make changes to it with the Delete List Editor. From the Pull Down Menu select ***Tools => Delete List Editor***. From this tool you can add or remove concepts from a Delete List. From the Pull Down Menu select ***File => Save as Delete List*** and either replace the old file or save it as a new file.

NOTE : *If you decide to make changes to the Delete List then* ***Undo*** *the applied Delete List and reapply the new one.*

10. Generate Output

After preprocessing the text it's time to produce output from them. The Pull Down Menu ***Generate*** contains functions that tell AutoMap to write output for the function selected; Concept Lists, Semantic List, Parts of Speech, and other useful functions.

Each function outputs files that can be examined for analysis and used to further process the text files.

11. Example of Output for Concept List

From the Pull Down Menu select ***Generate => Concept List***. AutoMap will ask for the directory to save the concept list.

```
concept,frequency,relative_frequency,gram_type,tf-idf
"He","1","0.5","single","0.0"
"John_Smith","1","0.5","single","0.0"
"United_States_of_America","2","1.0","single","0.0"
"citizen","1","0.5","single","0.0"
"lives","1","0.5","single","0.0"
```

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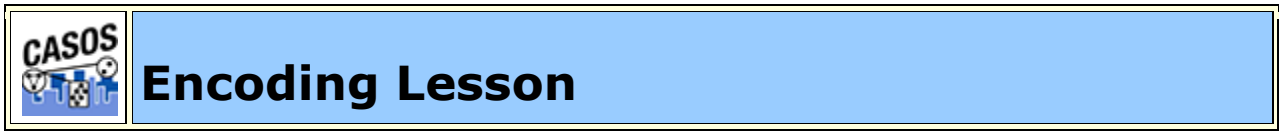


Encoding Lesson

Encoding Problems

The first you need to know is when you use the **Select Input Directory** AutoMap expects to find files in the standard **UTF-8** format. If the files in the directory are encoded differently the text in the display will not show up correctly.

Because the text you want to analyze could possibly come from a variety of sources there's no assurance that it's in the UTF-8 format. Word files, web pages, emails, or

whatever else you can find can have a variety of encodings. And sometimes when you import text you find it's **NOT** in the form you thought it would be.

Those empty little boxes

Occasionally, when importing text, you will get empty boxes instead of the some specialty characters. This is due to differences in the encoding schemes. What is the problem? It's a simple explanation and a simple fix.

> There are two kinds of UTF-8, with and without the BOM (Byte Order Mark) at the beginning of the file. Microsoft products require the BOM in order to recognize UTF-8, and the UTF-8 they produce has a BOM. Most other products produce UTF-8 without a BOM.
>
> Technically no BOM is required for UTF-8, but Microsoft has adopted the convention of using its presence to distinguish that encoding from the OS default.

So without that marker some of your text may become mismarked.

Cut-and-Paste problems

Your first document may have started out with a proper UTF-8 format. But as you begin cutting and pasting material from other sources you may be adding oher formats. Anytime text is pasted into another document it retains it's encoding.

Smart Quotes

Smart quotes are not considered proper quote characters. The standard value for the straight quote character is **34**; there is only one character for both the beginning and ending quotes. The smart, or curly, quotes are actually two entirely different characters, **“** (left curly quote mark) and **”** (right curly quote mark).

The original designers of the ASCII character set did not define a standard method for identifying properly curved quotation marks, so computers have had a problem properly exchanging quotation marks ever since.

The Solution

First try AutoMap's **Text Import** function and allow AutoMap to try to detect the sources encoding. This function is designed to convert text into standard UTF-8 format.

If the program doesn't work, you can also use a third party text-editor to convert the data. Both Microsoft Word and the free Notepad++ text editor (http://notepad-plus.sourceforge.net/uk/site.htm) support this functionality. Simply open the file in

your editor and do a **Save As...** a .txt file. Microsoft's Notepad saves files as single-byte ANSI (ASCII) by default.

Foreign Characters Sets

Foreign characters sets are an entirely different matter. These will require you to have the proper font installed on your computer as each font can possibly be encoded differently.

17 JUN 09

Using a Concept List

Description

Concept Lists (the frequency of concepts in one file) and Union Concept Lists (the frequency of concepts throughout all loaded files) can be used to work with concepts from one or more text files. It lists the frequency, relative frequency, and gram type. When working with multiple files you'll find the Union Concept List useful.

NOTE : *The number of unique concepts considers each concept only once. The number of total concepts considers repetitions of concepts.*

Concept List Procedure

1. Select a text file(s) to use

Place your text file(s) in an empty directory. Load the file(s) by selecting from the Pull Down Menu ***File => Import Text Files***.

theBoy-4.txt:

```
See the boy named Dave. He has 2 balls. 1 ball is red. 1 ball
is blue.
```

milkAndCookies.txt:

```
Dave wants milk and cookies. He drives to the store. He then
buys milk and cookies.
```

2. Create Concept List

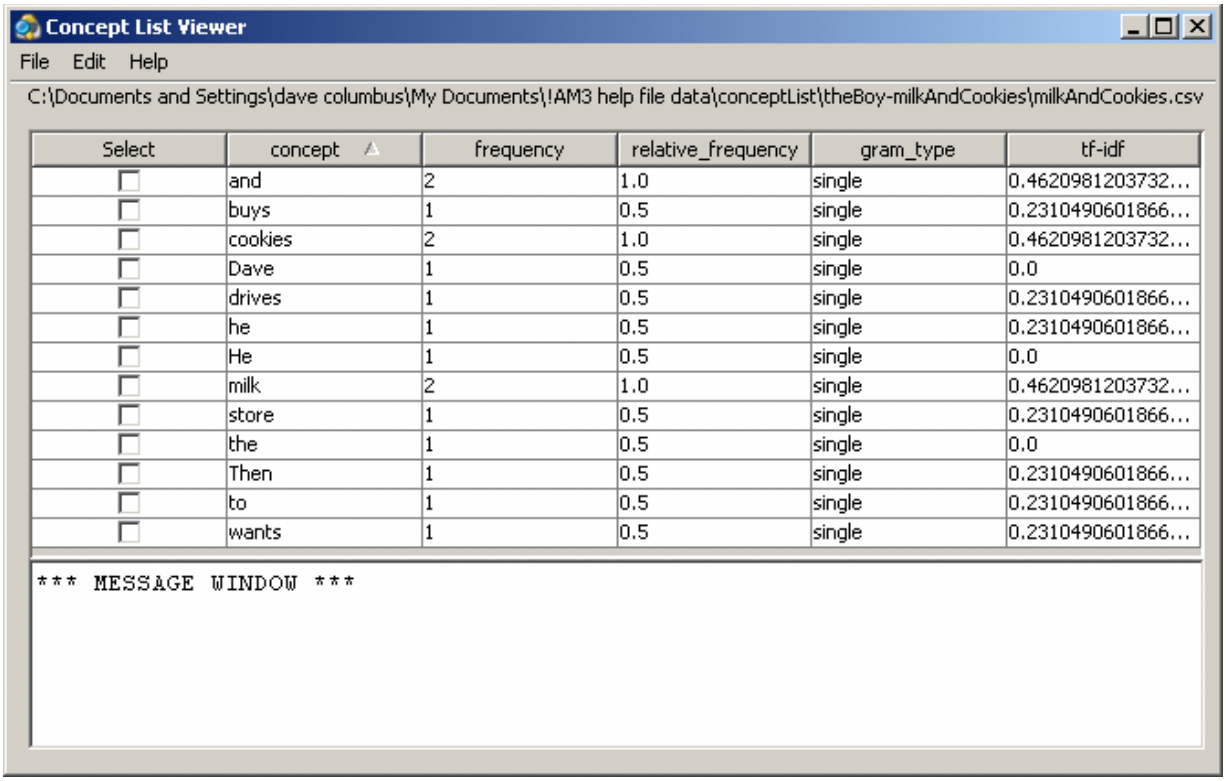
From the Pull Down Menu select ***Generate => Concept List => Concept List (per text)***. Navigate to where you want to save the file(s) and click **Select**.

3. Decide if you need Union Concept List

After specifying the directory for the Concept List(s) AutoMap will ask if you want to create a Union Concept List. Unless you know you will not need it, click **Yes**.

4. Review a Concept List in the Concept List Viewer

The Concept List(s) and Union Concept List can be viewed using **Concept List Viewer**. From the Pull Down Menu select ***Tools => Concept List Viewer***. From the Viewer Pull Down Menu select ***File => Open File*** and navigate to the location of the concept list to view.



Select	concept	frequency	relative_frequency	gram_type	tf-idf
☐	and	2	1.0	single	0.4620981203732...
☐	buys	1	0.5	single	0.2310490601866...
☐	cookies	2	1.0	single	0.4620981203732...
☐	Dave	1	0.5	single	0.0
☐	drives	1	0.5	single	0.2310490601866...
☐	he	1	0.5	single	0.2310490601866...
☐	He	1	0.5	single	0.0
☐	milk	2	1.0	single	0.4620981203732...
☐	store	1	0.5	single	0.2310490601866...
☐	the	1	0.5	single	0.0
☐	Then	1	0.5	single	0.2310490601866...
☐	to	1	0.5	single	0.2310490601866...
☐	wants	1	0.5	single	0.2310490601866...

NOTE : *If you load a Union Concept List the right-most column has the header* ***relative_percentage*** *denoting the frequency of a concept occurring in all text files.*

Concept List Viewer functions

Sorting a Concept List

A Concept List can be sorted by clicking on any of the headers. This will sort the list in an ascending order. Clicking the same header again will reverse the sorting order to descending. Which header is being used will be denoted by a small triangle to the left of the header name.

NOTE : *The small triangle to the right of the header will tell you which header is used for sorting and whether it's in ascending* ***upward facing arrow*** *or descending* ***downward facing arrow*** *order.*

Creating a Delete List

A Delete List can be created from the Concept List Viewer. Place a check mark in the **Selected** column of each concept to include in a Delete List. From the Pull Down Menu select ***File => Save as Delete List***. AutoMap will prompt you to select a location to save the Delete List. Give it a unique filename and click **Open**.

NOTE : *The Delete List can be saved in either the .txt or a .csv format.*

This new Delete File can now be loaded and applied to your texts.

Selecting Concepts

In the Viewer ***Edit*** menu the viewer gives you options for selecting/unselecting multiple concepts.

Select All : Places a check mark in every check box.

Select None : Clears all check marks from the concept list.

Select Minimum Threshold : The number input will select concepts with frequencies equal to or greater than the threshold to be selected.

Select Maximum Threshold : The number input will select concepts with frequencies equal to or lesser than the threshold to be selected.

Find : will highlight the input text, if found, with a cyan background.

Reset Colors : removes all highlighting.

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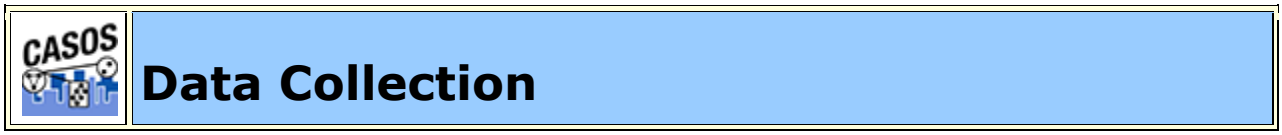


Data Collection

Description

AutoMap is designed to extract, analyze, and interpret relational data (also known as network data) from unstructured, natural language text data.

Relation Extraction Sources

The source of your daya can be anything: books, television, newspapers, blogs, emails, internet sites. AutoMap will extract the data and sort it into relational data which can be further analyzed in ORA.

Method

The first thing to do is identify the problem/goal.

Next all/some of the concepts need identified in the texts and the links between them (binary, typed, directed, weighted) can be defined.

Now this data can be represented as relational data (graph or list).

Then the data can be analyzed.

And finally the results can be interpreted.

How is network data collected?

Interviews, Automated (web-based surveys).

Person	Albert	Betty	Charlie
Albert	0	1	0
Betty	0	0	1
Charlie	0	1	0

Data collection is more of an approximation via Network Text Analysis as most real-world networks and sequential data are not iid (independent and identically distrbuted). Network data is a concise represntation of what's in the text data - Is it not the truth, only an approximation.

22 JUL 09

Using a Delete List

Description

Delete Lists allow you to remove **non-content** bearing conjunctions, articles and other noise from texts. It also allows you to delete concepts that you just don't care about for analysis purposes.

Delete Lists can be created internally in AutoMap or externally in a text editor or spreadsheet. They are a preprocessing stage done before doing any output.

NOTE : *Whether you apply the Delete List(s) before or after applying a Thesauri will depend on your exact circumstances. AutoMap allows for applying multiple Delete Lists is that is a necessity, one before and one after.*

Delete List Procedure

1. Select a text file(s) to use

Place the text to use in an empty directory. Below is an example text.

tedInUSA.txt

```
Ted lives in the United States of America. He lives on a dairy
farm. He considers it a good life. Would he ever consider
leaving?
```

2. Create a Concept List

To create a Delete List it helps to know the frequency of the concepts in the files. From the Pull Down Menu select ***Generate => Concept List***. Save the file in your output directory.

3. Create a Delete List

A Delete List can be created within AutoMap using the Concept List Viewer. From the Pull Down Menu select ***Tools => Concept List Viewer***. Navigate to the directory containing the Concept List file and select a file. In the Viewer place a check mark in the Selected column next to the concepts to include. From the View Pull Down Menu select **File => Save as Delete List**. Save the file in your support directory. The Delete List created can be viewed in the Delete List Viewer by selecting ***Tools => Delete List Viewer***.

A Delete List can also be created in Excel. Load the Concept List in Excel and sort by the frequency column. Create a new column and label it Delete List. Place an **X** next to all concepts to include in the Delete List. Sort the spreadsheet by the Delete List column. Copy all the rows containing an X in the Delete List column. Create a new sheet and paste these rows into it. Delete the column with the **X**s. Save this file as a .txt file.

NOTE : *For large concept lists review the top 100 entries and add concepts to the Delete List items. Resort primarily by the Delete List column and secondarily by the concept column. Review the top 100 again. Repeat this process until the top 100 entries are of interest. review the rest of the list for other unneeded or unwanted concepts. Save this list as a .txt file.*

TIP : *Create a cut-off limit (e.g. a word needs to be used at least three times. Concepts used less than that are placed on the Delete List.*

tedInUSADeleteList.txt

```
in
the
of
he
on
a
it
```

4. Apply a Delete List

From the Pull Down Menu select ***Preprocess => Apply Delete List***. Navigate to the directory where your delete list is stored.

5. Adjacency Option

AutoMap will ask what type of adjacency you what to use. The **Adjacency option** determines whether AutoMap will replace deleted concepts with a placeholder or not.

- **Direct Adjacency :** Removes concepts in the text that match concepts specified in the delete list and causes the remaining concepts to become adjacent.
- **Rhetorical Adjacency :** Removes concepts in the text that match concepts specified in the delete list and replaces them with **(xxx)**. The placeholders retain the original distances of the deleted concepts. This is helpful for visual analysis.

6. The newly pre-processed texts can be viewed in the main window.

Delete List with Rhetorical Adjacency

> Ted lives **xxx xxx** United States **xxx** America. He lives **xxx xxx** dairy farm. He considers **xxx xxx** good life. Would he ever consider leaving?

Delete List with Direct Adjacency

```
Ted lives United States America. He lives dairy farm. He
considers good life. Would he ever consider leaving?
```

NOTE : *If using Direct Adjacency the concepts are* ***NOT*** *replaced with anything. The concepts are moved next to the ones before and after. For more information on Delete Lists see the Content section.*

NOTE : *If you need to remove the Delete List it can be* ***Un-applied*** *using the* ***Undo*** *function under the Pull Down Menu* **Preprocess** *or from the quick launch buttons.*

Other Delete List Functions

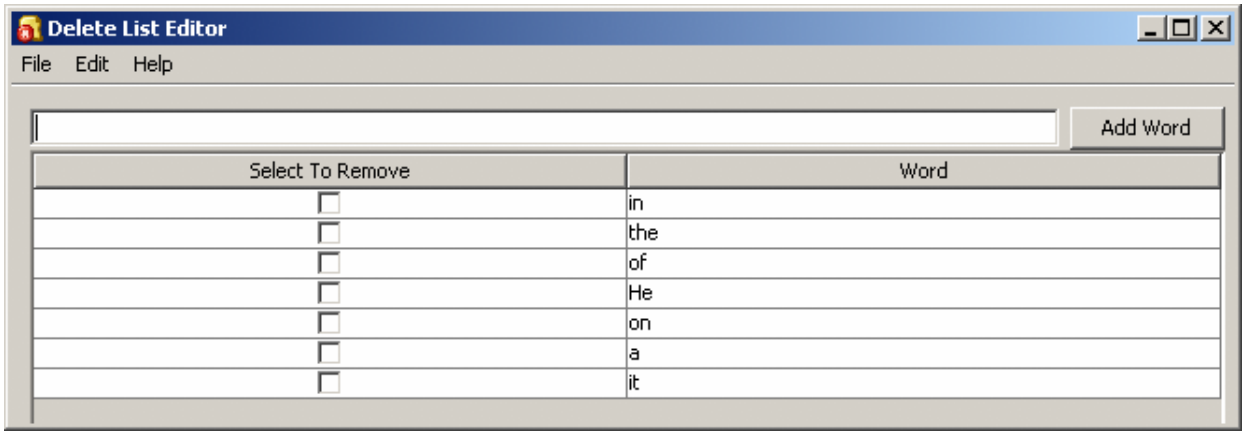
Multiple Delete Lists

Multiple delete lists can be applied to the same text in any order the user wants. They can be viewed in order using the Pull Down Menu.

NOTE : *This is useful if you have multiple specialty Delete Lists.*

Modifying a Delete List

After a Delete list is created you can modify it using the **Delete List Editor**. From the Pull Down Menu select ***Tools => Delete List Editor***. From the View Pull Down Menu select ***Open File*** and navigate to the Delete List to view.



From this window you can:

- **Add Concepts:** In the textbox above the list type **one** new concept then click **[Add Word]**. Your new concept will be added to the list. Repeat until you've added all concepts necessary. The next time you save the Delete List it will be saved without the checked concepts.

- **Remove Concepts :** Click in the check box next to the concept to remove in the **Select to Remove** column.. The next time you save the Delete List it will be saved without the checked concepts.

  NOTE : *No concepts are added or deleted until you actually save the file.*
- **Create New Delete List :** From the viewer Pull Down Menu select ***File => Save as Delete List***. AutoMap will prompt you to select a directory and give the file a new file name.

  NOTE : *Make sure to give the file the **.txt** extension.*

Save text(s) after Delete List

After applying a Delete you can save your texts by selecting from the Pull Down Menu ***File => Save Preprocess Files***. This step must be done before any other preprocessing as this option saves the texts at the highest level of preprocessing.

23 SEP 09

Using a Generalization Thesaurus

Description

Thesauri are generally used to take multiple concepts, in different forms, and compile them under one **key concept**. If this is not done then the same concept could be listed many times as individual concepts.

Thesauri Procedure

1. Select your text file(s)

Copy these files into a text editor and save them as **johnSmith.txt** and **countryThesauri.csv**. Place the johnSmith.txt in a folder by itself. Place countryThesauri.csv in an accessible folder other than where johnSmith.txt resides.

usCitizen.txt

```
John Smith lives in the USA. He is a United States citizen.
```

2. Prepare your Thesauri

For this simple file the thesauri is short. Larger texts could easily have hundreds of entries. This can be done in either a text editor or a spreadsheet.

usCitizenGenThes-Ext.csv

```
The United States of America,United_States
United states,United_States
John Smith,John_Smith
America,United_States
USA,United_States
```

3. Loading the files

From the main menu select ***File => Import Text Files***. Navigate to the directory where you placed johnSmith.txt and click **Select**. The file will appear in the main window.

4. Applying the thesauri

From the main menu select ***Preprocess => Apply Generalization Thesauri***. Navigate to the directory where you placed countryThesauri.csv and click **Select**. The thesauri will be applied and a new text will appear in the window with the thesauri substitutions. **Apply Thesauri (3)** will now appear in the dropdown menu denoting AutoMap has applied the thesauri.

Text after thesauri applied

```
John_Smith lives in the United_States. He is a United_States
citizen.
```

Thesauri Editor

AutoMap contains a **Thesauri Editor** making it easy to revise your thesauri files. From the dropdown menu select ***Tools => Thesauri Editor***.

From the Thesauri Editor menu select ***File => Open File***. Navigate to the directory with your thesauri and click **[Okay]**. From the Thesauri Editor you can make changes to the thesauri.

Questions regarding Thesauri

Different Thesauri for different purposes

You might initially think it's necessary to keep all the thesauri entries in one place. Just easier to find everything. But it essence it would make it easier to keep track by splitting up the thesauri into smaller files, each with it's own purpose. Below are some of the specialty thesauri used in this lesson.

You might have a general countries thesauri that is always used to fix multiple ways of posting a country. The U.S. can be listed in a multitude of ways:

```
U.S., America, United States, The United States of America
```

A country thesauri could have all these permutations listed and convert them all to the same concept say, `United_States`. So instead of four individual concepts you would have one.

```
U.S.,United_States
America,United_States
United states,United_States
The United States of America,United_States
```

If your project concentrates on a particular field you could have a thesauri that contains names of organizations, resources, or people's names which appear with regularity.

Analysts working on a similar subject every day would need the same names, places, and resource for each run. A special thesauri could take care of that and would be easier to maintain as a single file.

Is the thesaurus case-specific?

NO! If there are two or more entries for the same concept the first thesaurus entry will be used for all replacements.

```
HE,Tom
He,Dick
he,Harry
```

Every instance of **HE, He, and he** will be replaced with **Tom** without comparing their case.

Running the Delete List Before or After the Thesauri

You may also find it necessary to run a Delete List on your files. Whether you apply a delete list before or after applying a generalization thesauri will depend on your set of files. A longer discussion can be found in the Content section under **Process Sequencing**.

Using of one large thesauri vs. multiple smaller thesauri

This will be a personal choice of the user. Multiple thesauri have the advantage of easier editing but the downside is needing to apply multiple thesauri to the same set of files.

NOTE : *When doing multiple runs on the same data some analysts prefer to maintain a single thesaurus.*

NOTE : *The Generalization Thesaurus is NOT case sensitive to what it finds in the text. United States, United states, and united States are all considered the same bi-gram and would be replaced with the same entry.*

23 SEP 09

Description

Compares two Concept Lists and displays concepts that appear in either both files (white background) or in a single file (red or green background). The viewer is called from the pull-down menu by selecting ***Tools => Concept List Viewer***.

Load

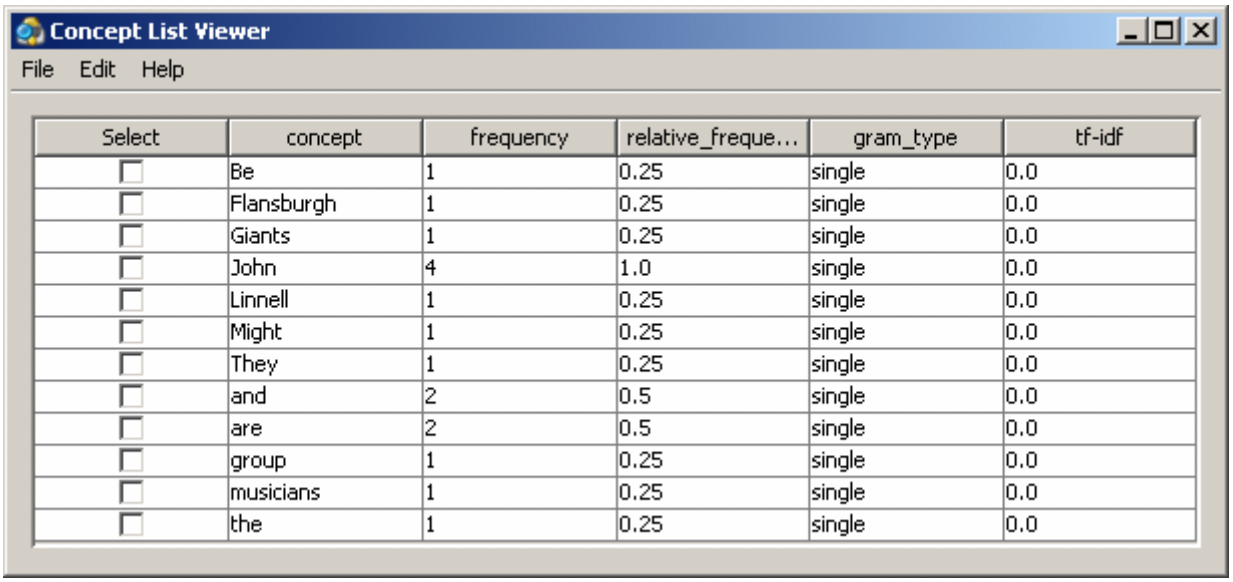
This example will use a Concept List created with a raw file and a Concept List created after applying a thesaurus. This will be used to demonstrate how the viewer detects frequency differences.

tmbg.txt

```
John Flansburgh and John Linnell are musicians. John and John
are the group They Might Be Giants.
```

The tmbg's file is loaded into AutoMap with ***File => Import Text Files*** and a Concept List is created ***Generate => Concept List => Concept List (Per Text)***. This Concept List is then loaded into AutoMap with ***Tools => Concept List Viewer***.

NOTE : *Notice the concept* ***John*** *has a frequency of* ***4****.*



Select	concept	frequency	relative_freque...	gram_type	tf-idf
☐	Be	1	0.25	single	0.0
☐	Flansburgh	1	0.25	single	0.0
☐	Giants	1	0.25	single	0.0
☐	John	4	1.0	single	0.0
☐	Linnell	1	0.25	single	0.0
☐	Might	1	0.25	single	0.0
☐	They	1	0.25	single	0.0
☐	and	2	0.5	single	0.0
☐	are	2	0.5	single	0.0
☐	group	1	0.25	single	0.0
☐	musicians	1	0.25	single	0.0
☐	the	1	0.25	single	0.0

Close the Concept List Viewer.

Go to the directory where your Concept List is saved and rename it tmbg-noThes.csv. This will prevent AutoMap from overwritting the file.

Apply the generalization thesaurus tmbg-genThes.csv file with ***Preprocess => Apply Generalization Thesauri***.

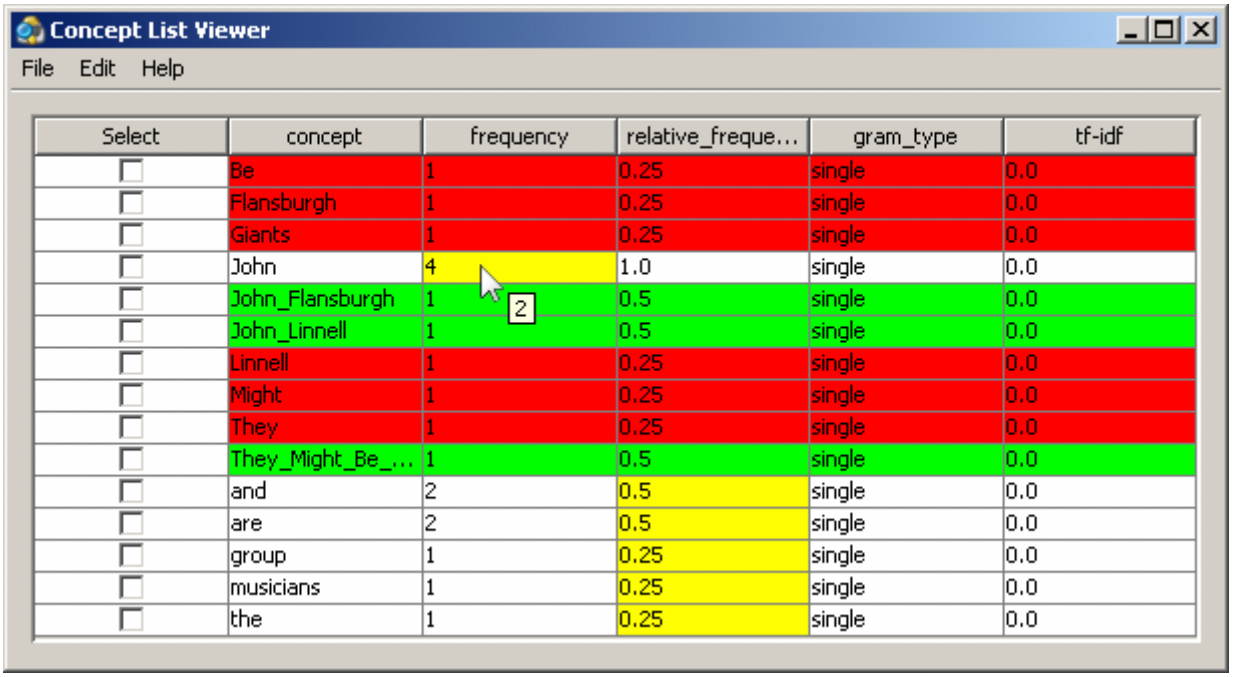
tmbg-genThes.csv

```
John Flansburgh,John_Flansburgh
John Linnell,John_Linnell
They Might Be Giants,They_Might_Be_Giants
```

Create a Concept List with ***Generate => Concept List => Concept List (Per Text)***. This Concept List, named tmbg.csv, will be used as the compare file.

Comparing the two files

Start the Concept List Viewer with ***Tools => Concept List Viewer***. Load the first Concept List with ***File => Open File*** and navigate to the directory containing the tmbg-noThes.csv (the file without the thesaurus applied). Next we will compare this with the second file. From the pull-down menu select ***Edit => Compare File*** and navigate to the direcoty containing tmbg.csv (the file with the thesaurus applied).



The concepts with white backgrounds are found in both files. The concepts with red backgrounds are found only in the original file. The concepts in green are found only in the newly compared file.

The cells with the yellow backgrounds are concepts found in both files (e.g. concepts on white backgrounds) but they have different values. Notice on the image below the arrow hovering over the frequency value for **John**. In the original file John had a value of **4**. The tooltip displays a value of **2** which is the value in the compared file.

Message Log Window

After making a comparison AutoMap will display the statistics of the comparison in the Message Log Window. It will display added (green), deleted (red), and altered (yellow).

08 SEP 09

Description

The **Compare File** functions is implemented in many of the tools: **Delete List Editor, Thesauri Editor, Concept List Viewer, and Table Viewer**. It will compare the currently loaded file with a second file on disk and display if an entry is

contained in both files (white background), originally loaded file (red background), or the compared file (green background).

NOTE : *The example uses thesauri files but the color coding is identical across all the included tools.*

The Files

Below are the files used in this lesson. They can be copied and saved and used for your examples. Be sure to save them in the .csv format.

abc.csv	xyz.csv	a.csv	az.csv	a-caps.csv
a,alpha b,beta c,charlie	x,x-ray y-yankee z,zulu	a,alpha	a,alpha z,zulu	a,ALPHA

The Comparisons

Open a file

Start the Thesaurus Editor from the pull-down menus ***Tools => Thesauri Editor***. From the Editor pull-down menu open the file **abc.csv**.

Select	To	From
☐	a	alpha
☐	b	beta
☐	c	charlie

Comparing a sub-set file

From the editor pull-down menu select ***File => Compare Files***. Select the file **a.csv**. This file contains a single concept from the original **abc.csv** file.

Select	To	From
☐	a	alpha
☐	b	beta
☐	c	charlie

The line **a,alpha** in white shows this concept is found in both files. The next two lines **b,beta; c,charlie** show these concepts are found in the original file but not in the compared file.

Compare to an exclusive file

From the pull-down menu select ***File => Compare Files*** and select the file **xyz.csv**. The **xyz.csv** file contains no concepts that are found in the **abc.csv** file.

Select	To	From
☐	a	alpha
☐	b	beta
☐	c	charlie
☐	x	x-ray
☐	y	yankee
☐	z	zulu

The green lines for **x,x-ray; y,yankee; z,zulu** show these concepts are only found in the new file. The red lines for **a,alpha; b,beta; c,charlie** show these concepts were found in the original file but are absent from the compared file.

A Super-set

From the pull-down menu select ***File => Compare Files*** and select the file **abcxyz.csv**. The compared file is the super-set of the original file which contains all the original concepts plus some unique concepts.

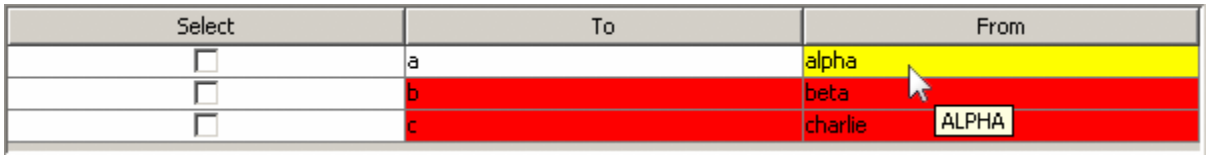
Select	To	From
☐	a	alpha
☐	b	beta
☐	c	charlie
☐	x	x-ray
☐	y	yankee
☐	z	zulu

The white lines **a,alpha; b,beta; c,charlie** show these concepts are contained in both files. The green lines **x,x-ray, y,yankee; z,zulu** show these concepts are found only in the compared file.

Different values

From the pull-down menu select ***File => Compare Files*** and select the file **a-caps.csv**. The compared file contains only one similar term to the original file but the key_concept is different.

There will be times when the same concept has different values in each file. This is defined by a yellow background. The value will display what is in the original file. By hovering over the cell it will display in a tooltip the value contained in the compared file.



A Mixed Thesaurus

The most common comparison will be a mixture of terms that appear, or are missing from, each file.

From the pull-down menu select ***File => Compare Files*** and select the file **az.csv**. This file contains all the concepts from the **abc.csv** plus three additional concepts.

Select	To	From
☐	a	alpha
☐	b	beta
☐	c	charlie
☐	z	zulu

The white line for **a,alpha** shows this concept was found in both the original and compared files. The red lines **b,beta; c,charlie** show these concepts were found in the original file but not the compared file. The green line **z,zulu** shows this concept exists only in the compared file.

21 AUG 09

Remove Items

Description

Removing unwanted, or unneeded, items is important to reduce the amount of data to analyze. This include white space, punctuation, numbers and symbols.

Remove Extra White Spaces

In many texts there are extra white spaces inserted between words or before and after punctuation. This is partly a holdover from the days of the typewriter of double spacing after a period. But with proporional fonts it's now an unnecessary practice. AutoMap finds instances of multiple spaces and replaces them a single space. Below is a text with varying number of white spaces between words.

spaces.txt

```
one space. two  spaces. three   spaces. four    spaces.
```

After AutoMap removes extra white spaces it's much easier to read.

```
one space. two spaces. three spaces. four spaces.
```

Remove Punctuation

Punctuation is mainly for use in making sure the reader understands how the words are expressed. During analysis they are somewhat unnecessary as the words themselves are more important. The Remove Punctuation function removes the following punctuation from the text: **.,:;' "()!?-**. AutoMap will remove the punctuation and either close up the sapce between or insert a white space as a placemarker.

punctuation.txt

```
"English" is hard (so very hard)!?! What's with all these
commas (,), semi-colons (;), and colons (:).
```

Removing Punctuation and inserting white space

```
 English  is hard  so very hard    What s with all these
commas      semi colons      and colons
```

Removing Punctuation and NOT inserting white space

```
English is hard so very hard Whats with all these commas
 semicolons  and colons
```

Remove Symbols

Symbols are parts of language which are not concepts but assist in understanding the language. Occasionally these symbols need to be removed to make semantic networks and meta-networks better understood.

Removing the Default List of Symbols

AutoMap has a default list of symbols that can be removed:
~`@#$%^&*_+={}[]\|/<>.

NOTE: *This option is an all-or-nothing function.*

symbols.txt

```
As he emailed {bob@jewelry.com} he knew the $200.00*
|+shipping| on [http://jewelry.com\~necklace] would = a ^50%
was a <`bargain>. And his #1 girl & mom deserved the best.
```

Removing Symbols and inserting white space

```
As he emailed  bob jewelry.com  he knew the  200.00
 shipping  on  http:  jewelry.com  necklace  would   a  50
 was a   bargain . And his  1 girl   mom deserved the best.
```

Removing Symbols and NOT inserting white space

```
As he emailed bobjewelry.com he knew the 200.00 shipping on
http:jewelry.comnecklace would  a 50 was a bargain. And his 1
girl  mom deserved the best.
```

Removing a User Set of Symbols

The second option for removing symbols is to define the list you want removed. The list consists of one line with all the symbols to remove together with no spaces between the entries.

symbols.txt

```
As he emailed {bob@jewelry.com} he knew the $200.00*
|+shipping| on [http://jewelry.com\~necklace] would = a ^50%
was a <`bargain>. And his #1 girl & mom deserved the best.
```

Removing Set of Symbols containing {}[]#

```
As he emailed bob@jewelry.com he knew the $200.00* |+shipping|
on http://jewelry.com\~necklace would = a ^50% was a
<`bargain>. And his 1 girl & mom deserved the best.
```

Remove Numbers

Removing numbers will remove not only numbers as individual concepts but also removes numbers embedded within concepts.

Remove Options

There are two options for removing numbers.

1. Replacing the number(s) with a space
2. Removing the number(s) and closing the distance between the letters before and after.

Examples

Remove numbers as individual concepts.

buckleMyShoe.txt

```
1, 2, buckle my shoe! 3, 4, shut the door
```

Text after RemoveNumber:

```
, , buckle my shoe! , , shut the door.
```

Numbers within other concepts and closing up distance.

c3pO.txt

```
C3PO was a robot in the movie Star Wars.
```

Text after RemoveNumber:

```
CPO was a robot in the movie Star Wars.
```

Numbers within other concepts and inserting white space.

c3pO.txt

```
C3PO was a robot in the movie Star Wars.
```

Text after RemoveNumber:

```
C PO was a robot in the movie Star Wars.
```

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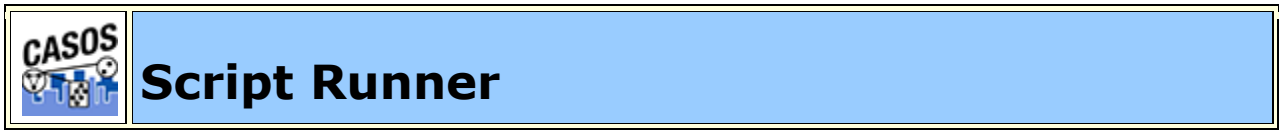


Script Runner

Scripts can be created in AutoMap and saved or directly in the ScriptRunner GUI.

From AutoMap

Import a text file in AutoMap. For this lesson I'll be using Julius Caesar's Act 4 **act 1.txt**. Now either press the **Quick Launch Delete List button** or select **PreProcess > Apply Delete List** and apply a Delete List. For the Delete List I'll use **juliusCaesar_DL.txt**.

When AutoMap is finished processing select from the menu **File > Save Script File**. Navigate to a directory to save your script.

Start the ScriptRunner by selecting from the menu **Tools > ScriptRunner**.

NOTE : *If you don't have the newset .NET installed you will get a .NET Framework error. Just press OK - it will start.*

First you need to create a temp directory to store processing results. It also contains all the files ScriptRunner generates. The temp directory differs from the Output directory as the temp directory is where AM3 stores it's work file. Output directories are created by AM3 on an individual basis for each type of output generated.

From the main menu select **File > Load Script File**. Navigate to the directory where the file just created was saved, select it, and click OK.

Click the Parameters tab and review the procedures from the loaded script. You will see one line containing the parameters of the file to use:

tempWorkSpace : Displays the pathway for ScriptRunner's work area.

textDirection : LT, RT, LB, RB

textDirectory : The pathway to the file(s) loaded.

textEncoding : Displays how ScriptRunner will load the file. In our example this is **autoDetect**

Click the **PreProcessing** tab. You will see the one process performed from AutoMap, Apply Delete List. In this simple script this is the only item under the PreProcessing tab.

adjacency : Value can be **r** - rhetoric or **d** - direct.

deleteListLocation : Display the pathway for the Delete List. This pathway shows where the Delete List resides when we created the script in AutoMap.

inputDirectory : Allows you to specify a different directory to use to for your input files. Useful if you want to test something on a subset of files. When using a script created in AutoMap this does not have to be filled in. ScriptRunner will use the directory used by AutoMap.

NOTE : *If you designate an input directory that doesn't exist the script will fail and you will see the dialog box with the little bomb.*

outputDirectory : Allows you to change the final destination for output files written. When using a script created in AutoMap this does not have to be filled in. ScriptRunner will use the directory used by AutoMap.

NOTE : *If creating a script in ScriptRunner then you will have to specify these two directories else you might not know where your files are being written. AM3 won't create directories for you. It will only browse. This makes you decide where you want to store the results.*

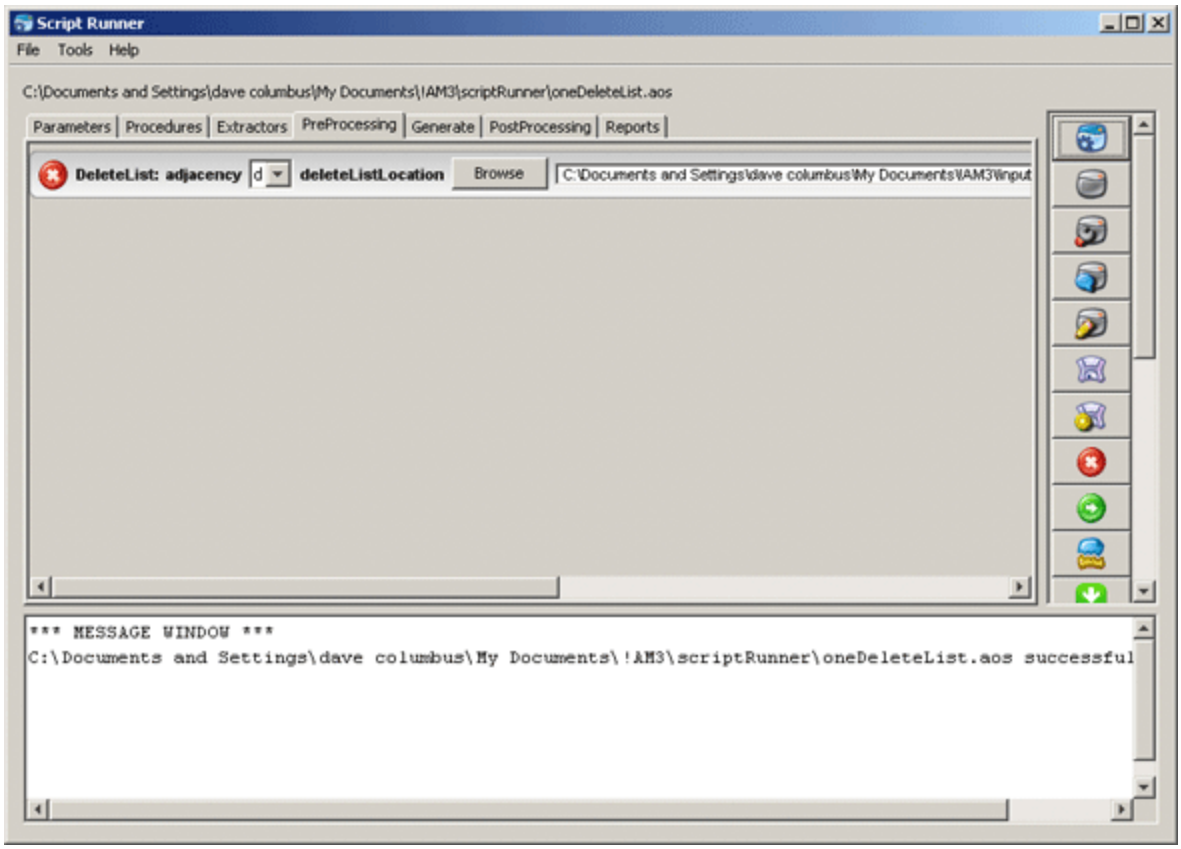
For some reason you may want to either remind yourself of some fact about this Delete list or tell a new user something they may need to know. You can **insert a comment or print a message**.

Display Message : The message typed in the text box will be displayed in a dialog box when the script is run. Primarily used to send a message to the user.

Insert Comment : Usually used to annotate the script. Primarily used to remind the creator of the script the purpose of any particular action.

Insert a Comment does not display anything on screen. It is for you to annotate what you did. When other people open your script they won't have to guess why you chose to do a certain action. It's also helpful when you come back to a script to jog your memory as to your reasons for how it was constructed.

When creating more complicated scripts you can **drag and drop** any of the buttons to the canvas to add items. You can also delete any item by clicking the **Red X**. You can also modify the order of the items however you want.



Above shows how to place a message that will be displayed in a dialog box for the user. You can type whatever you want displayed in the text box.

NOTE : *Yes could also drag-and-drop a second Delete List as duplicate processes can be executed twice in a row. This is usually done when you have multiple Delete Lists for specific purposes.*

Running External Programs

Used to extend ScriptRunner's usage by running other applications (i.e. the NotePad application). Primarily used if you need to adjust some data or result before allowing the script to proceed.

Add New Programs

Fills in the pathway to the program and also inserts a new button at the bottom of the quick launch pane.

NOTE : *This function requires you have* ***NET Framework 4.0*** *installed. If not installed then pressing the button will have no effect.*

Working with Large Thesauri

Description

When working with a large amount of documents, each one being large themselves, you will find your thesauri growing increasing large. There are several items which you should be aware of in this circumstance.

The Order of the Thesaurus

The order of the thesaurus entries can have an impact on your results. Better results will be obtained if the thesaurus is in a descending length order.

The **Sort Thesaurus** function can assist in ordering your thesauri. From the pull-down menu select ***Procedures => Sort Thesaurus***. Navigate to the thesaurus you want to sort. Then give it a new name, and if you want, a new location and save it.

The Sort Thesaurus functions sorts by number of words in an entry. The order of entries with the same number of words will not change.

See The AutoMap GUI > Procedures Menu for more information

Conflicts in Data

A problem can occur when you have more than one agent or location with the same name. In the beginning the text may specifically refer to **John Smith** and **John Doe** but afterwards you might find that a person is only referred to as **John**. AutoMap will use the first occurrence of John it finds when making substitutions.

AutoMap processes a thesaurus from top to bottom. This is why it's important to sort a thesaurus by the length of the entries.

Sequence of Operations

```
Mohammed abd al-Sha'bai
```

This name contains both punctuation and symbols. Depending on the order of the preprocessing you could end up with any of the following three:

```
Mohammed_abd_al_Sha_bai
Mohammed_abd_al-Sha'bai
Mohammed_abd_alShabai
```

How General Is Too General?

If you start with a 2,000 page text set, you will probably be unable to read all of the text prior to starting the processing. One of the problems you may encounter in such situations relates to common names and terms. For example, a preliminary review of the text may reveal that the documents contain an individual named **Joe**. Given that this is very common name, the data may contain several other individuals named **Joe**. Should this occur the program will incorrectly process all Joes as if they were the first Joe. Users need to exhibit caution before including common names and common terms in their thesauri.

If your text contains two names, `Joe Smith and Joe Jones` and a thesaurus entry for the name `Joe` then AutoMap will substitute all Joes for the first entry in the thesaurus.

Using the ThesauriContentOnly option

You create a Meta-Network (Carley, 200) with the one-grams **dog, cow, and farm**. If you are going to use the **UseThesauriContentOnly** option then those three terms need to be in your General Thesaurus also. If they are not in the thesaurus then they will be eliminated from the output and the Meta-Network will not see them to tag them.

Positive or Negative Links

AutoMap creates links between nodes. But AutoMap does not differentiate between positive and negative links. After processing that is up to the analyst.

```
The U.S. lacks formal diplomatic relations with North Korea,
Bhutan, and Cuba, but has close relationships with Canada and
the U.K.
```

Using a large window will create a fully connected graph with all links the same type. It will also make connections for all the countries involved. The reality is that there should be positive links to Canada and the U.K. and negative links to North Korea, Bhutan, and Cuba.

Using a small window size would create a link set that is wrong:

```
US => North Korea => Bhutan => Cuba => Canada => UK
```

right:

```
negative links: US => North Korea; US => Bhutan; US => Cuba

positive links: US => Canada; US => UK
```

Extracting a Semantic Network

Description

Text files have connections but they are sometimes difficult to see. You can use AutoMap and process them to create semantic networks which can be viewed in ORA.

This lesson details processing text files in AutoMap to extract a Semantic Network, how to view it in ORA. Other lessons will detail specific reports that can prove useful.

What is a Semantic Network?

Semantic networks are knowledge representation schemes involving nodes and links between nodes. It is a way of representing relationships between concepts. The nodes represent concepts and the links represent relations between nodes. The links are directed and labeled; thus, a semantic network is a directed graph.

Procedure

This lesson will use the file: **JC_summary-1.txt**.

Load text document into AutoMap

Place all the text files for conversion into a single folder. From the Pull Down Menu select ***File => Import Text Files***. The first text will be displayed in the main window and the filename will appear in the Filename Box. Using the File Navigation Buttons you can navigate through the loaded files.

Build a General Thesauri

Many people, places and things are made up of two or more words. For example Julius Caesar, Brutus's House, status of Caesar. Before producing any files usable in ORA it's necessary to combine these multi-word concepts into **key concepts**.

NOTE : *Some concepts include the definite article in their name and should be included in the thesaurus.*

If you have no previous thesaurus then one will need to be created from scratch. This will require going through the text files and finding those multi-word concepts

and creating a list of key concepts. The format for this is `multi word concept,key_concept`.

NOTE : *Be sure* ***NOT*** *to leave any spaces before or after the comma.*

Below is part of the Generalization Thesaurus that is used for this lesson. It contains concepts from the Julius Caesar text.

juliusCaesar-GenThes.csv

```
Ides of March,Ides_of_March
Julius Caesar,Julius_Caesar
Julius Caesar's,Julius_Caesar
Julius Caesar's status,statue_of_Julius_Caesar
kill Caesar,kill_Caesar
kills herself,commit_suicide
king,emperor
letter,forged_letters
```

Apply a General Thesauri

After the thesaurus is created it is time to apply it to the text. From the Pull Down Menu select ***Preprocess => Apply Generalization Thesauri***. Navigate to the directory where the thesauri is saved and click **[Select]**. Next a dialog box will appears asking if you want to use **Thesaurus Content Only**. Leave the response as **No**.

See ***Content => Thesaurus Content Only*** *for more information.*

Notes about Thesaurus Building:

1. In large texts there may be multiple person with the same first name.
2. The definite article in the concept like **the USDA** would be placed in the Thesaurus instead of being deleted in the Delete List.

Create the Concept Lists

Next we need to create a Delete List. One way is to first create a Concept List and use this to help in creating a Delete List. The frequency attribute will assist in finding unneeded and unwanted terms.

From the main menu select ***Generate => Concept List => Concept List (Per Text)***. Navigate to the directory to save the files and click **[Select]**. AutoMap will ask if you want to create a **Union Concept List**. Click **[No]** as you only have one file loaded.

NOTE : *With multiple files loaded you would select* **Generate => Concept List => Concept List (Union Only)**. *This creates one list for all files currently loaded.*

Build a Delete List

Open the Concept List Viewer by selecting ***Tools => Concept List Viewer***. From the viewer menu select ***File => Open File***. Now navigate to the directory containing the newly created Concept List and click **[OK]**.

Click the header **Frequency**. This will sort the concepts by the number of occurrences in the file(s). To build a Delete List place a check mark in the **Selected** column for all the concepts you wish to place in the Delete List. When you are finished select ***File => Save Delete List***. Navigate to the folder you want to save the Delete List file. Close the Viewer.

Apply a Delete List

From the main menu select ***Preprocess => Apply Delete List***. Navigate to the directory with your newly created file and click **[OK]**. You will be asked whether you want Rhetorical (replaces deleted concepts with a placeholder **xxx**) or Direct (removes the concept entirely) adjacency. For this lesson I choose rhetorical.

NOTE : *The placeholder* ***xxx*** *will not output to the DyNetML file as a concept.*

Create a DyNetML file

Now it's time to generate the DyNetML. From the Pull Down Menu select ***Generate => Concept List => Concept Network (Per Text)*** for separate DyNetML files or ***Generate => Concept List => Concept Network (Union Only)*** to create one file with concepts from all files. AutoMap will output **XML file(s)** usable directly in ORA. You will directed to select the destination folder for these file(s).

NOTE : *When processing multiple files and selecting the* ***Per Text*** *function AutoMap will ask if you want to create a Union of all Semantic Network files.*

The DyNetML file(s) will contain one NodeClass of Concepts. After loading into ORA Nodes can be separated into individual NodeClasses and links can be created to form Networks.

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First Run with the Script

Description

All of AutoMap's functions can be accessed through the script. The two required files are the AM3Script (The AutoMap program) and a .config file (designed by the user). Additional files could include Delete Lists, Thesauri, or other list files necessary by the program.

Create a Workspace

A good starting point is creating a project directory, a place where all your input (your text files), output (files AutoMap writes), and support (required files by certain functions) files will reside. This helps prevent files from getting lost. One suggestion is to create a top level project directory then create input, output, and support directories within that directory.

```
C:\My Documents\dave\project\input
C:\My Documents\dave\project\output
C:\My Documents\dave\project\support
```

The .config file

Find the blank .config file in the AutoMap directory and make a copy. Rename this to something regarding your project. Open it in your text editor to begin editing the file. The blank .config file will appear as below.

```
<?xml version="1.0" encoding="UTF-8"?>
<Script>
<Settings>
   AutoMap textDirectory="" tempWorkspace="" textEncoding=""/>
</Settings>

<Utilities>
<PreProcessing>

</PreProcessing>
<Processing>

</Processing>
<PostProcessing>

</PostProcessing>
</Utilities>
</Script>
```

Initial Setup

The first thing to do is tell AutoMap where your input files are and where you want the output files to be written.

```
<Settings>
   AutoMap textDirectory="C:\My Documents\dave\project\input"
```

```
   tempWorkspace="C:\My Documents\dave\project\output"
   textEncoding="" />
</Settings>
```

PreProcessing Functions

Now decide which functions of AutoMap you need to run on your files. These are divided into three areas: **Preprocessing, Processing, and PostProcessing**. Review the documentation on the various functions to decide which functions you need to run on your text.

A Generalization Thesaurus

Usually a Generalization Thesaurus is the first file to create. This can be done in either a text editor or spreadsheet. Create a list of single/multi word concepts from the text and the key concepts they should be translated to.

In a **text editor** create each pair on a single line separated by a comma. Make sure to **NOT** leave a space between the comma and the two items.

```
   United States of America,United_States_of_America
```

Save this file as a **.csv** file.

In a **spreadsheet program** place the single/multi word concept in the first column and the key concept in the second column.

A	B
United States of America	United_States_of_America

Save this file as a **.csv** file.

In your project .config file in the Preprocessing section insert the command for applying a Generalization Thesaurus. Place the pathway to the newly created thesaurus in the **thesauriLocation** parameter and choose whether to use the **thesauriContentOnly** option.

NOTE : *thesauriContentOnly is set to* ***y*** *(put only concepts from the thesaurus in the output file) or* ***n*** *(use all concepts form the text files).*

```
<PreProcessing>
   <Generalization thesauriLocation="C:\My
   Documents\dave\project\support\thesauri.csv"
   useThesauriContentOnly="y" />
</PreProcessing>
```

Save the file.

A Delete List

After all the key concepts have been identified it's time to find the **unneeded and unwanted** concepts. A Delete List removes these concepts and reduces the overall number of concepts to analyze. The procedure for applying a Delete List is similar to applying a thesaurus.

In a **text editor** create a list of concepts to be removed from the text. Each line should contain only one concept which consists of a single word. There should be no extra spaces or punctuation included.

```
and
the
but
```

Save this file as a **.csv** file.

In a **spreadsheet program** place each concept to delete in a single cell in the first column

A
and
the
but

Save this file as a **.csv** file.

In your project .config file in the Preprocessing section insert the command for applying a Delete List. Put the pathway to the newly created Delete List in the **deleteListLocation** parameter and choose whether to use the **saveTexts** option.

```
<PreProcessing>
   <Generalization thesauriLocation="C:\My
   Documents\dave\project\support\thesauri.csv"
   useThesauriContentOnly="y" />
   <DeleteList adjacency="r" deleteListLocation="C:\My
   Documents\dave\project\support\deleteList.txt" saveTexts="y"/>
</PreProcessing>
```

Save the file.

Other Preprocessing Functions

Any number of the preprocessing functions can be included in the script file in whatever order you need them. Insert the commands within the **<Preprocessing** tags in the order you need them performed.

NOTE : *am3script will perform these function in the order they are placed in the script. Make sure you know what order you need to perform each task.*

Processing Functions

Next thing to consider are the steps to take after the preprocessing is finished. These include most of the functions that output files and are based on the text after preprocessing. To run a Processing function the command is placed between the **<Processing>** tags.

Processing functions with no parameters

Processing functions which take no parameters include **Anaphora, ConceptList, UnionConceptList, and NGramExtraction**. Placing these tags between the **<Processing>** tags automatically performs these functions in the order that order.

```
<Processing>
   <ConceptList />
   <UnionConceptList />
</Processing>
```

Processing functions with parameters

All other Processing functions require parameters to set for successful completion. This is either the location of a support file or parameters necessary to complete the function. The parameters follow the tag and are separated by a space and the value is enclosed in quotes.

```
<Processing>
   <SemanticNetworkList directional="U" resetNumber="1"
   textUnit="S" windowsize="5" />
</Processing>
```

If a tag requires a file to work then the pathway needs to be placed in the location parameter. An incorrect pathway will cause the AutoMap function to fail.

```
<Processing>
   <Meta-Network thesauriLocation="C:\My
   Documents\dave\project\support\thesauri.csv" />
</Processing>
```

PostProcessing Functions

The last step is to determine which, if any, postprocessing functions are needed. These are used to alter the DyNetML before running in ORA. They include **addAttribute, addAttribute3Col, and UnionDynetml**. The addAttribute and addAttribute3Col both take an external file with a list of attributes to add. The UnionDynetml requires the **unionType** to create either a **s** semantic or **m** Meta-Network (Carley, 2002) output file.

```
<PostProcessing>
   <addAttribute attributeFile="C:\My
   Documents\dave\project\support\attribute.csv" />
   <unionDynetml unionType="s" />
</PostProcessing>
```

Output files will be written to the designated output directory.

Running the Script

After all the Preprocessing and Processing tags are completed the script can now be run.

Open a Command Window from the Start menu and navigate to the directory containing AM3Script. Move your **.config file** to this directory. At the command prompt type **am3script project.config**. Am3script will execute using the .config specified. Output files will be found in the directory specified in the tempWorkspace parameter.

```
<Settings>
   AutoMap textDirectory="" tempWorkspace="" textEncoding=""/>
</Settings>
```

NOTE : *Be sure to leave a space between am3script and the name of your config file.*

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